ELECTRICAL WEST

June, 1947
25 cents

Convention-In-Print, Page 85
Appliances, Page 113

SPOKESMAN FOR THE MOST HIGHLY ELECTRIFIED REGION OF THE U. S.

Now!
of hot water with an effi
signed automatic Electric
No waiting! Modern p
available now!
How?
dealer, and he will
installation! Trim,
Electric Water H
anywhere because it
Wow!
whole family!
silent, spic-a
Heater will su
water without
What?
Electric Water Heaters are available
No more waiting! Your dealer will sho
the smart new models, and arrange for
tion in your home immediately!
Hot!
right, day or night . . . that's
with your trim, safe and at
Water Heater! No fuss
and spic-and-span clean!
Lot!
whole family . . .
Heater gives y
water proves it
by day, year
THRIFT-NOTE:
. . . An Electric Water Heater is economical . . . it costs less to operate than ever before —only one cent per kilowatt hour!
Edison
Electric Water
Heaters . . . Now
Available
Flash!
Good news for housewives!
postwar automatic Electric
Heaters are available now!
safe and attractive, they are
efficient, more economical tha
Dash!
See your dealer right away, and or
your Electric Water Heater! H
will help you select just the righ
style and size for your home, and
arrange for immediate installation!
Splash!
Splash to your heart's content—you'll have plenty of hot water any time, all the time! Budget-wise, an Electric Water Heater is as pleasing as it is silent and spic-and-span clean!
Thrift-Note:
An Electric Water Heater is economical, too! It costs less to operate than ever before—only one cent per kilowatt hour!
Edison
At Your Dealer NOW!
Southern California Edison Company
Need!
Every home needs lots of hot water. Now you can have it with an automatic Electric Water Heater! Designed for beauty and safe operation —there's a size for your family!
Heed!
Now Available
Your dealer has postwar Electric Water Heaters for your inspection and selection now! He will make every arrangement for immediate installation in your home!
Speed!
Instant, abundant hot water wherever, whenever you need it is yours with an Electric Water Heater! Day by day and year by year, electric hot water is a better buy!
Thrift-Note:
An Electric Water Heater is economical, too! It costs less to operate than ever before—only one cent per kilowatt hour!
Edison
At Your Dealer NOW!
Southern California Edison Company

EDISON PUTS HEAT ON

Electric Water Heaters

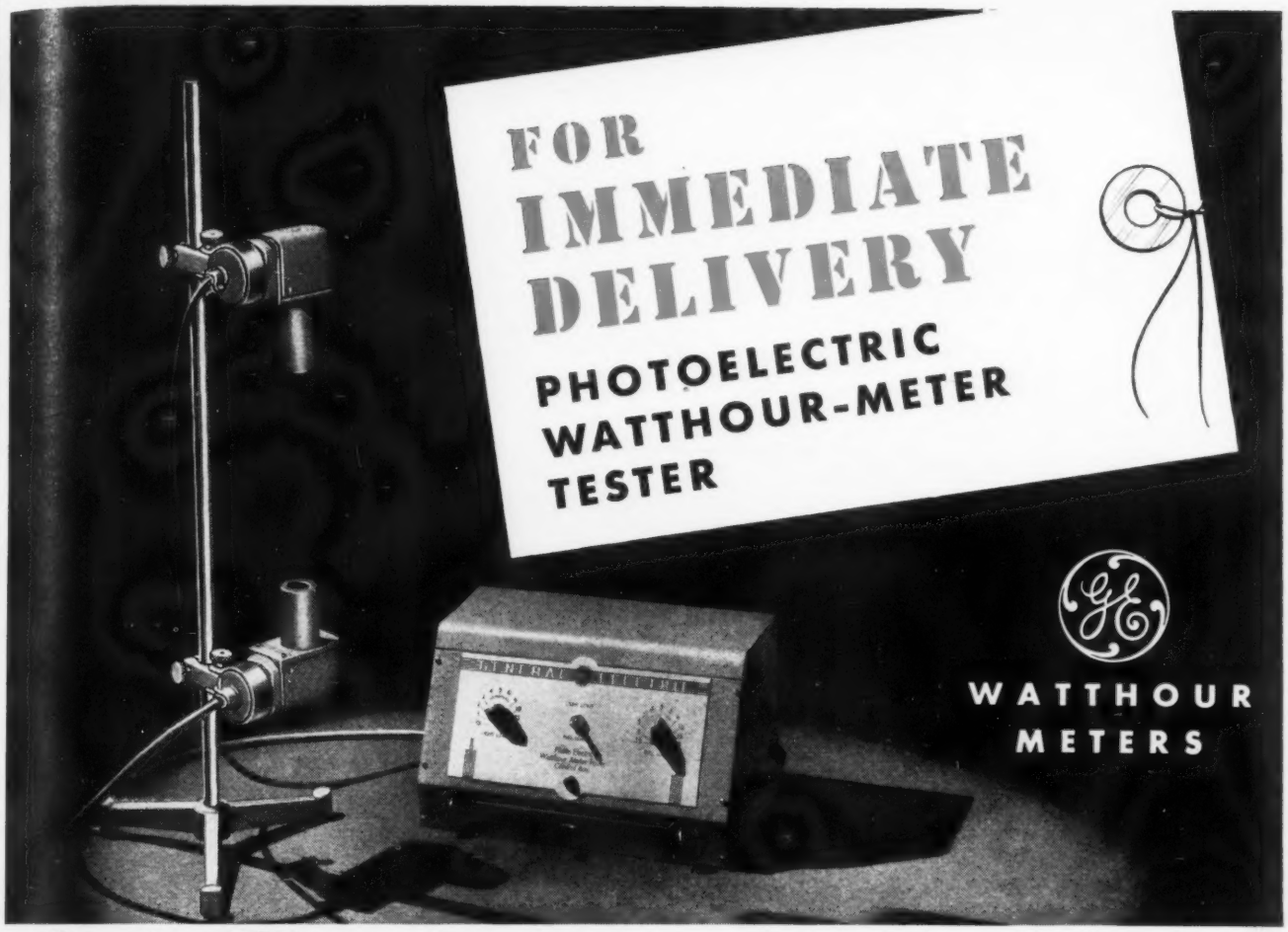
In Edison territory, promotion of the sales of electric water heaters has been in full swing for the past month.

Newspaper ads (like those shown here), window and store display material, bumper strips, sales manuals, magazine ads have been supplied by Edison to promote the sale of these appliances, which are now available in quantity for the first time since Pearl Harbor.

Edison is out to help appliance dealers make this the biggest electric water heater year in history!

Southern California Edison Company

Southern California Edison



Order Today!

INCREASE TESTING OUTPUT AS MUCH AS 50 PER CENT

***NOW*—the label "For Immediate Delivery" has been applied to General Electric's photoelectric watthour-meter tester—the tester that in more than five years' wide usage in the field has been proved to offer two fundamental advantages: saving in testing time and improved accuracy —resulting in reduced testing costs. Now, no delays—just place your order and it's on the way to you.**

USE OF "ELECTRIC EYE" PRACTICALLY ELIMINATES TESTING ERROR

Since the testing process is entirely automatic and the meter does not have to be watched during the test run, operators are free to do other essential work. Furthermore, the accuracy of this testing equipment—4/1000 of one per cent in one revolution of the meter disk—makes long running time unnecessary and eliminates the need for repeat runs to confirm the accuracy of the first reading. This means that running times are reduced to approximately one-half those of the old non-automatic testing procedure.

For further information about this electronic tester—how it works, how you can plan savings in test procedure, and how the equipment can be put to many other uses—contact your General Electric representative. *Apparatus Dept., General Electric Company, Schenectady 5, N. Y.*

HEADQUARTERS FOR MEASUREMENTS

GENERAL ELECTRIC

601-2

JUNE
1947

SPOKESMAN FOR MOST HIGHLY ELECTRIFIED REGION OF THE U. S.
The all-industry magazine of progress, established 1887, and incorporating the "Electrical Journal", "Journal of Electricity, Power and Gas" and "Journal of Electricity". Contents Copyright. Sixtieth year of publication.

ELECTRICAL WEST

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GOING AND COMING

It's hell to have to take several days from your work, get on a plane, fly to Montreal, hurry home again, etc. All that according to an engineer we overheard last week who's preparing to go back to the AIEE meeting.

He didn't get much sympathy. There were, in fact, immediate volunteers to go in his place.

Well, this month ELECTRICAL WEST is going to a convention and we figure we'd better say no more about it until after we've gone and come back. A glance at the printing production schedule indicates that will already have happened by the time you read this, but we'll hold our fire anyhow.

ELECTRICAL WEST is going down to Riverside in force, and for the benefit of you who can't go, and you who go but can't attend three meetings at one time, we'll bring back a fist full of pictures and detailed notes.

These we'll print in the July issue, and you'll get a pretty comprehensive picture of what went on down there at Riverside, which is to say what the new ideas are in your line of work, and what lies ahead.

We'll throw that in as an extra dish, for we've got a couple of engineering articles up our sleeve, a business-getting idea for small-town contractors, more about those Underwriters, and a lot of appliance selling news and angles.

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Cover photo: Hawaiian Electric Co. linemen, PhotoHawaii.

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Los Angeles (14) . . . Don Hanson, 621 S. Hope St., MI. 3873
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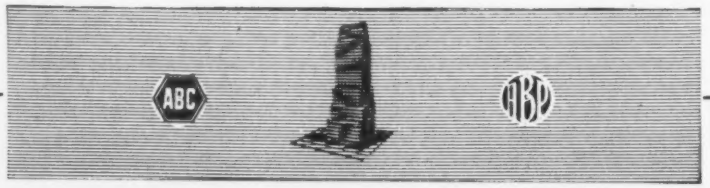

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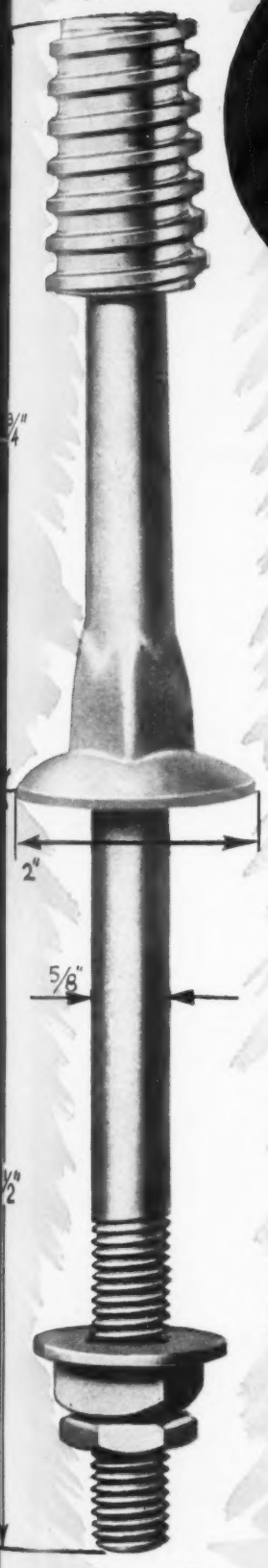


STEEL INSULATOR PIN NO. 223848

- 1" or 1⅛" Allen lead head, cast directly onto pin by special bonding process, makes head an integral part of the pin, impossible to turn or pull off.
- Packaged with cardboard cap on each pin to insure protection during shipment.
- Pin is made of carefully forged steel to provide ample stiffness and toughness. Base, construction, and design meet all EEI Standards.
- Large base gives good bearing surface on the cross arm.
- Hot-dip galvanized. Pin is carefully pickled before galvanizing to assure close bond between zinc and steel for increased protection.
- Clean, sharp cut threads on shank permit nut to spin on freely and to hold firmly when Palnut is tightened.
- Furnished with round washer, one square nut and Palnut.

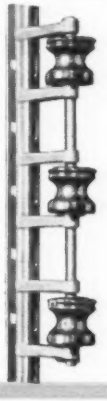
Line Material Company prides itself on constructing pole line hardware that is design-right and durable. The products in the L-M hardware line are designed the way the users want them to meet construction and maintenance requirements.

Look at the steel insulator pin shown here, one of a number of L-M pins. Carefully forged . . . hot-dip galvanized . . . securely bonded lead head . . . clean, sharp threads. L-M insulator pins are made with one thought in mind—to do a good job and keep on doing it for a long, long time. These pins are available in popular sizes, extending 4¾" and 6" above the cross arm, with varying lengths of shank. They are carefully packed for shipment, with a cardboard cap over each pin to insure complete protection of the rolled lead threads.

Ask the L-M Field Engineer

His broad experience, plus the accumulated knowledge of his company, give the L-M Field Engineer exceptional ability to help you. He knows many ways to solve line construction and maintenance problems; so ask him for his suggestions and ideas.

Weldsteel Secondary Rack No. 23038



One of the most popular types. No. 9-gauge pressed steel; insulator supports arc-welded to full depth of channel—extra strength for heavy service. Others for 2, 3, or 4 wires, from 4 to 12 inch spacing; 9 to 32 inches long.

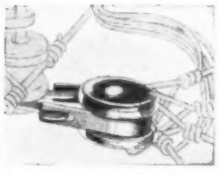
Strain Clamp No. 907

Forged steel, hot-dip galvanized. Light in weight, but exceptionally strong, with high tensile strength. Reversible tongue with grooves of different depths on each side gives proper contact with sizes from No. 6 solid to No. 4/0 stranded.

Universal Guy Clip No. CL-117X

Forged steel; rounded corners prevent injury to wire. Opposed bolts permit full 360° turn of wrench. Long non-slip grooves; large gripping area. Five sizes for ¼ to ½-inch wire.

Take-Off Insulator No. A-260010-1



Efficient, economical for handling multiple service drops. Eliminates overloaded rack spools and tangled connections. Steel yoke snaps into slots in insulator band, permits attaching yoke first. For rack or pole mounting.

LINE MATERIAL
POLE LINE HARDWARE

L-M DISTRIBUTION EQUIPMENT INCLUDES: Distribution Transformers • Fuse Cutouts and Fuse Links • Lightning Arresters • Oil Switches • Pole Line Hardware • Line Construction Specialties • Underground Equipment • Fibre Conduit • Street and Airport Lighting Equipment • Wired Radio Control Equipment • Capacitors

What qualities do you need

Tough Jobs

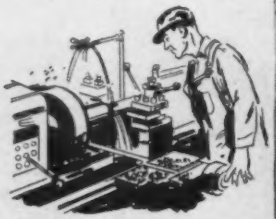
YOU CAN HANDLE WITH U·S·S AMPYROL

12 Permanent Colors. Ampyrol comes in vivid colors that are solid all the way through the insulation. There is no danger of lost circuit identification because colors do not fade or wear off.

You can crowd more wiring into less space because of the high dielectric strength of Ampyrol and its resistance to heat.

You can install wiring in damp locations where mold would quickly destroy other insulations.

You can often rewire buildings without tearing up the conduit because of the increase in current carrying capacity per square inch of conduit area.



You can be sure machinery wiring will not be damaged by cutting oils, lube oils, grease and coolants.

You can wire outdoor signs without fear of damage from weather and direct sunlight

Railway signal relay house. For applications like this, where large quantities of wiring must be crowded into small space, where temperatures are high, and positive identification of circuits is necessary, U·S·S Ampyrol is a good selection.

in wire and cable

HIGH CURRENT CARRYING CAPACITY?

CHEMICAL INERTNESS?

FLAME RESISTANCE?

BETTER AGING?

FLEXIBILITY AND EASE OF WORKING?

WIDE SELECTION OF COLORS?

U·S·S Ampyrol has them

Of all the electric wire and cable manufactured by American Steel & Wire Company, U·S·S Ampyrol is probably the most versatile. It can be used for hundreds of applications including electronic devices, building wiring, switchboards, motor leads and shipboard wiring.

U·S·S Ampyrol insulation is a thermoplastic resin compound which is chemically inert. It is unaffected by acids, alkalis, oil, moisture, grease and many common solvents. It will withstand ozone, oxygen and direct sunlight. Ampyrol does not support combustion. It has excellent aging qualities and remains flexible without cracking.

The chief difference between Ampyrol and other polyvinyl chloride insulations is in the method of manufacture. American Steel & Wire Company has developed special processes which assure better control at the mill. The resulting product is uniformly high in quality and physical characteristics.

If you have a difficult wiring job, find out about U·S·S Ampyrol. Write for complete information on types and sizes available.

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UNITED STATES STEEL

U·S·S Ampyrol Wire and Cable

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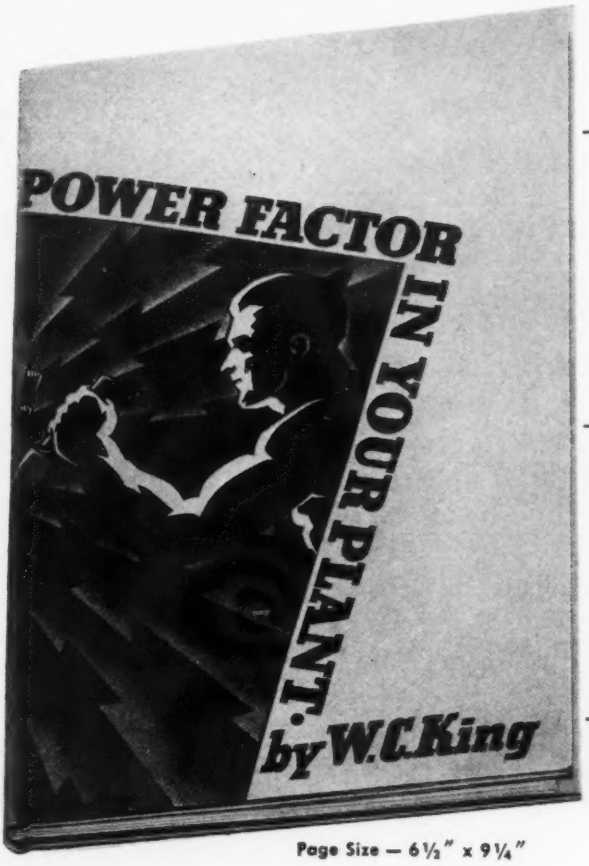

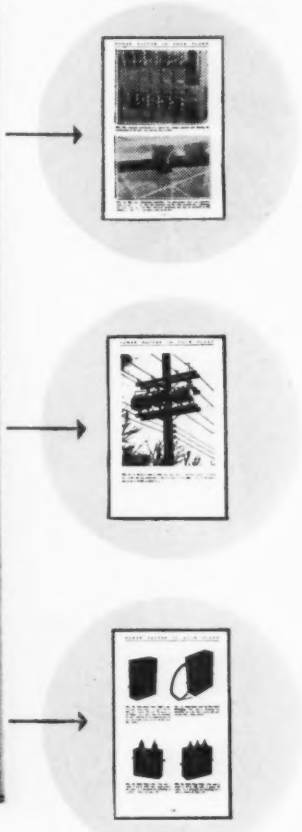

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Price $3.00

Page Size — 6½" x 9¼"

Here is a book that should have been published long ago. It takes the mystery out of power factor. In simple, understandable terms—without a lot of fancy mathematics—it gives you the answer to every power factor problem. It's written for working electricians—not college professors—and it approaches the subject of power factor from the viewpoint of the man who has to work with it. Its 214 pages are chock-full of valuable information for plant superintendents—maintenance engineers—electricians—designers. Cornell-Dubilier Electric Corporation, Dept. C6, South Plainfield, New Jersey.

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- Losses Caused by Poor Power Factor.
- The Effect of Power Factor on Voltage Drop.
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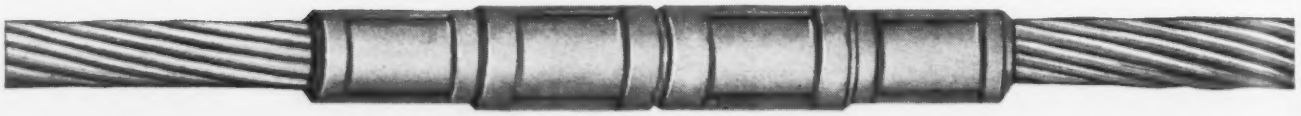
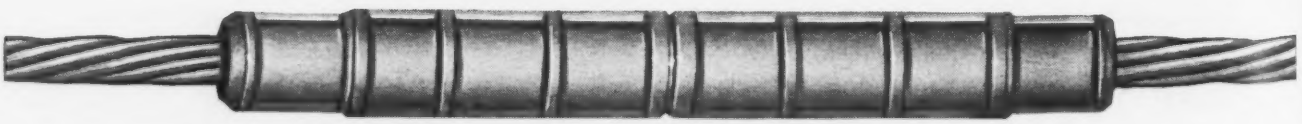


Completed Nicopress Splice on 4/0 Copper Conductor



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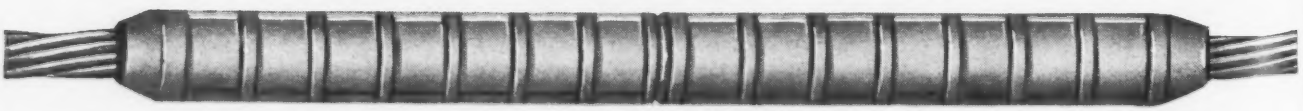

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The National

5100 SUPERIOR AVENUE

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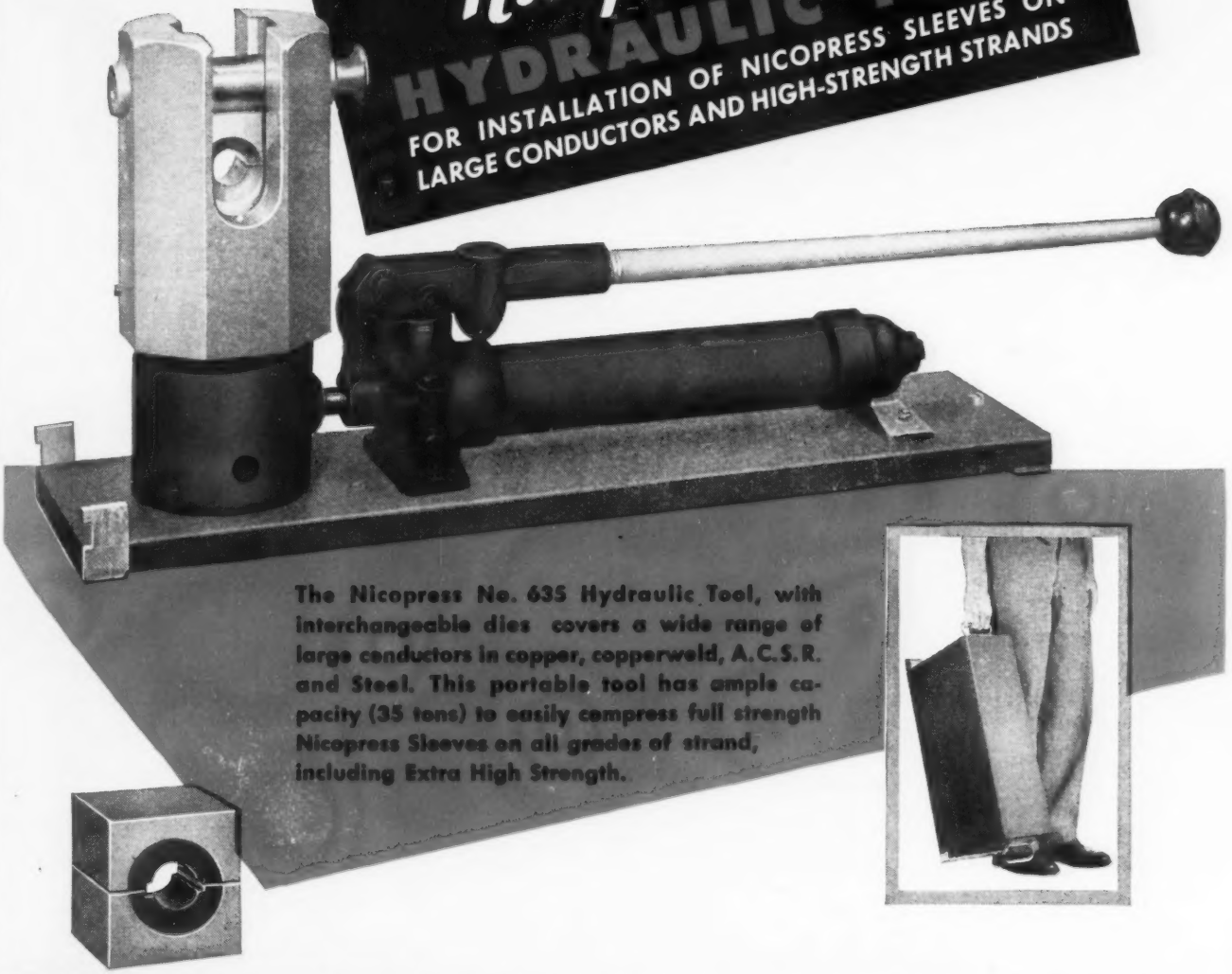
SLEEVES for LARGE CONDUCTOR & STATIC WIRE Ssplicing

Nicopress No. 635
HYDRAULIC TOOL
FOR INSTALLATION OF NICOPRESS SLEEVES ON LARGE CONDUCTORS AND HIGH-STRENGTH STRANDS



The Nicopress No. 635 Hydraulic Tool, with interchangeable dies covers a wide range of large conductors in copper, copperweld, A.C.S.R. and Steel. This portable tool has ample capacity (35 tons) to easily compress full strength Nicopress Sleeves on all grades of strand, including Extra High Strength.

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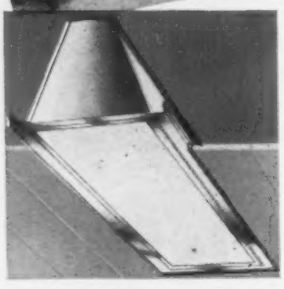

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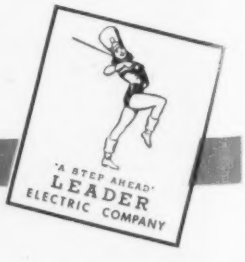
To those who cater to sports-loving America, good lighting has become a "must." They have proved to their own satisfaction that good lighting, fluorescent lighting by Leader, pays big dividends.

For bowling alleys, billiard parlors, or similar businesses that cater to public patronage, fluorescent lighting by Leader can do much to attract customers and to make their activities more enjoyable.

For home installations, too, such as basement or attic rumpus or game rooms, Leader fluorescent fixtures will add much to their charm and utility. For better lighting for better sports . . . Look to Leader.

Only better electrical wholesalers and contractors distribute and install Leader fixtures.



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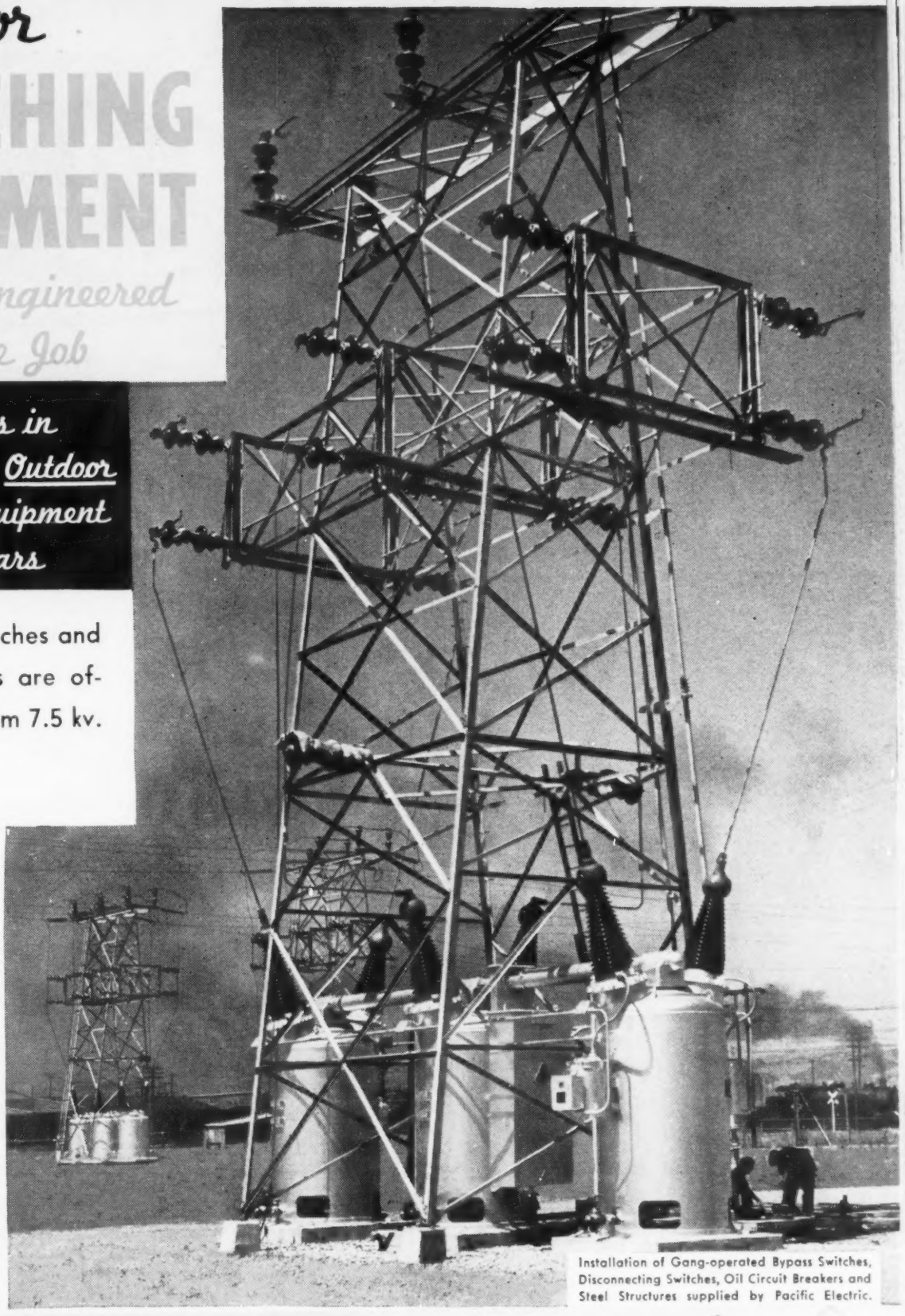
- Steel Structures



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QUESTION BOX ON *Oilostatic* TRANSMISSION SYSTEMS

Here are 96 more Questions and Answers!

Q. What is the Oilostatic Transmission System?

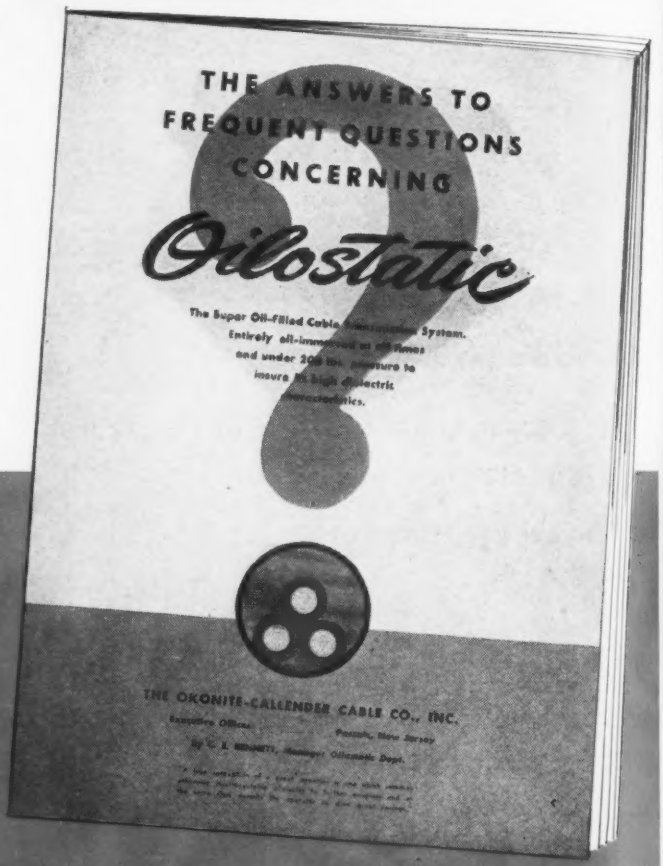
A. *The Oilostatic Transmission System is an oil-filled cable system which uses non-leaded power cables installed under 200-lbs. oil pressure in welded steel pipe lines.*

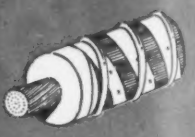
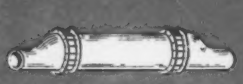
Q. What is the value of the Oilostatic System?

A. *Savings from 15% to 50% in initial cost, quick installation, ease of getting around physical obstructions, extremely high factors of electrical and mechanical safety. No cable failure has occurred on an Oilostatic System since introduced 15 years ago.*

Q. Where can I find out more about the Oilostatic Transmission System?

A. *By consulting an Okonite-Callender engineer or by writing on your business letterhead for Bulletin OK-1025. The Okonite-Callender Cable Company, Inc., Executive Offices, Passaic, New Jersey.*

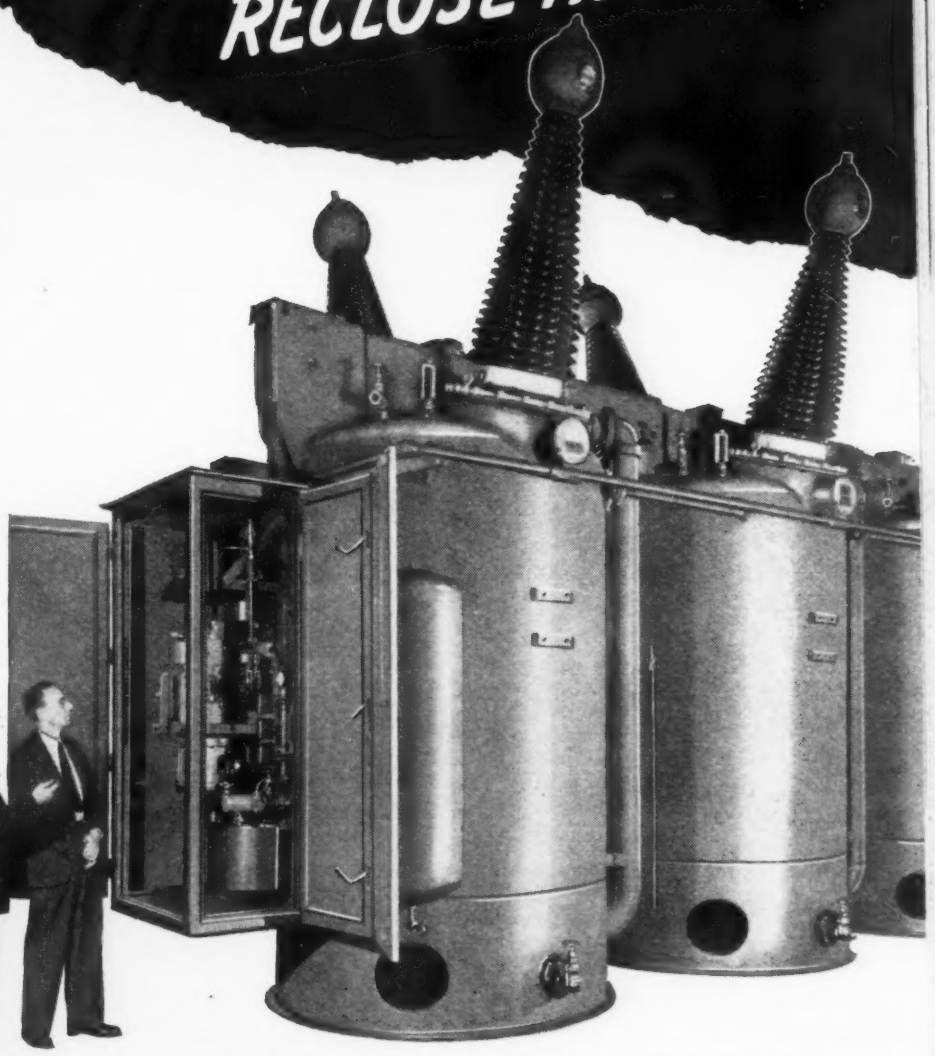


The Oilostatic Transmission System requires only these steps: . . . digging a narrow trench **. . . placing in it a welded steel pipe** **. . . pulling in solid type paper-insulated cable**  **. . . then connecting easily-made joints**  **and potheads** **. . . installing a prefabricated pumping unit and reservoir** **. . . applying 200 lbs. oil pressure for operation up to 230,000 volts.**

OKONITE-CALLENDER paper insulated power cables

Now...Breakers Rated 115KV and up INTERRUPT IN 5 CYCLES, RECLOSE IN 20!

- Give Your Lines Greater Stability
- Insure Continuity of Service
- Protect System and Equipment
- Improve Breaker Performance



BZO-line, 3-pole, 20-cycle outdoor oil circuit breaker. Ratings—115 to 230 kv . . . 1,500,000 to 3,500,000 kva interrupting capacity.

ALLIS-CHALMERS CIRCUIT BREAKERS PROVE THEMSELVES "IN SERVICE!"

Six of these modern outdoor, floor-mounted breakers, rated 161,000 volts, each with a continuous current carrying capacity of 800 amperes, have been serving a large eastern utility . . . proving their worth through low-maintenance, dependable operation!

Forerunners of new, improved breakers at right, these units are designed to interrupt up to 3,500,000 kva in less than 0.0840 seconds!

NEW, IMPROVED 5-CYCLE "RUPTOR" and ultra-rapid pneumatic operator team-up in Allis-Chalmers modern outdoor oil circuit breakers to give you lightning-fast "5-20" breaker performance . . . with all advantages above.

These breakers are built along simple, rugged lines, incorporate highly-dependable mechanism. Contacts are high-speed, single-break design—give you *longer* wear. They're quickly accessible for inspection, and may be checked by manual closing of breaker.

Arc quench efficiency is high. "Ruptor" unit snuffs out heavy short circuit arc within 0.055 of a second from parting of contacts. That means *minimum* arc energy release, *low* tank pressures, *less* contact and oil deterioration!

Yes, Allis-Chalmers "5-20" breaker performance is sound planning for system expansion. A representative in our nearby office will be glad to give you complete facts. Or write ALLIS-CHALMERS, MILWAUKEE 1, WIS.

A 2202

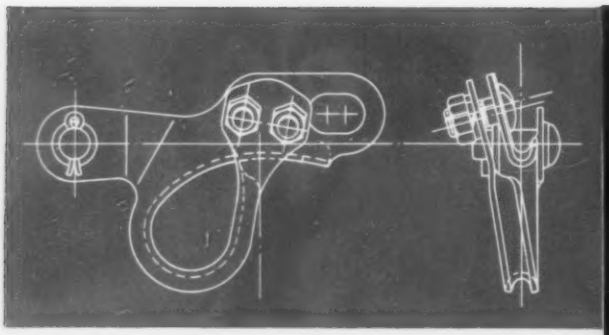
ALLIS-CHALMERS

1847 1947 A CENTURY OF SERVICE to Industry THAT MADE America Great

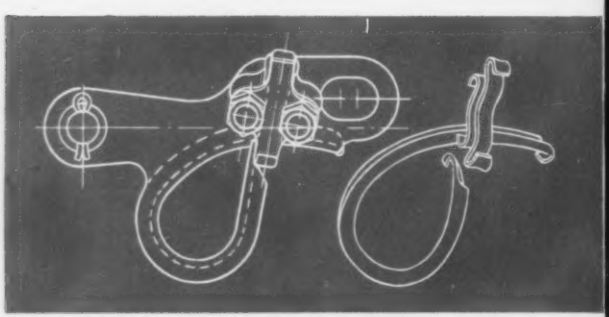
of the Big 3 in Electric Power Equipment — Biggest of All in Range of Industrial Products

BTC COMPLETE LINE OF

Made from High



2106
Conductor Sizes—Max. 0.366"—Min. 0.160"
For all conductors, except A.C.S.R. Light in weight . . . economical . . . efficient. Ideal for the popular 3-Strand Composite Conductors



2107
Conductor Sizes—Max. 0.398"—Min. 0.158"
For A.C.S.R. only — Supplied with factory-assembled soft aluminum liners in body and in double-wave-grip keepers. Use of field-applied armor tape is unnecessary. Exceptional holding power.

The general design of these new Strain Clamps, for Rural, Distribution, and Light Duty Transmission Lines, is the familiar, accepted, and efficient Snail-Shell Snubbing Type.

On each clamp, the one-piece body, without welded or riveted joints, is pressed from heavy gauge Chrome-Nickle-Copper-Manganese Alloy Steel with properties assuring long service life.

Strength — High Yield Point . . . High endurance limit . . . High resistance to shock, impact, fatigue, and abrasion.

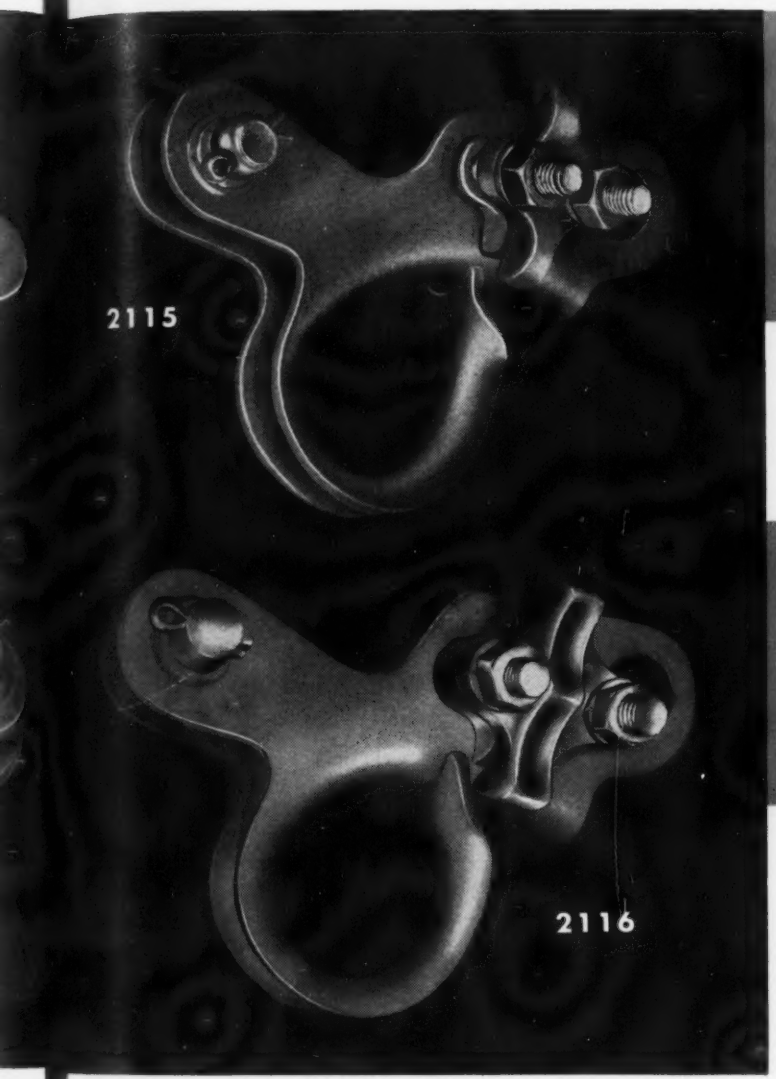
Corrosion Resistance—5 to 6 times that of mild carbon steel. Numerous tests and performance-in-use records prove the superiority of this alloy steel when subjected to severe industrial contamination, rural and seaboard atmospheric conditions, and immersion in sea water.

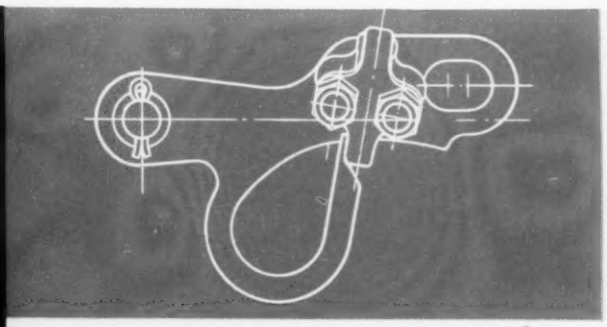
Because of these properties, this type of alloy steel has been extensively and success-

Sold only through your insulator manufacturer

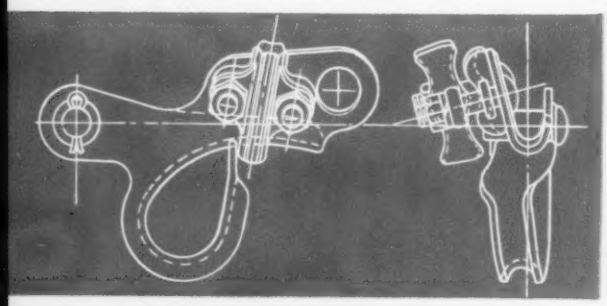
STRAIN CLAMPS

Strength, Corrosion Resisting Alloy Steel





2115
Conductor Sizes—Max. 0.4375"—Min. 0.1875"
For all conductors, except A.C.S.R. Double-wave-grip keepers assure positive holding performance.



2116
Conductor Sizes—Max. 0.550"—Min. 0.160"
For all conductors within its size range.
The use of armor tape, recommended on A.C.S.R., reduces the listed maximum cable size. This clamp with reversible, double-wave-grip keepers accommodates and holds, without slip, a very wide range of conductors. The perfect clamp for the utility regularly using several conductor types and sizes.

fully used in applications in the field of railroad, ship, and motor transportation; mining, road building, construction, excavating and conveying equipment; chemical, paper, oil, and power machinery; industrial buildings and facilities.

Excellent hot-dip galvanizing further increases the life span of the clamps. Extrusion of the metal around connecting-pin holes increases the bearing surface.

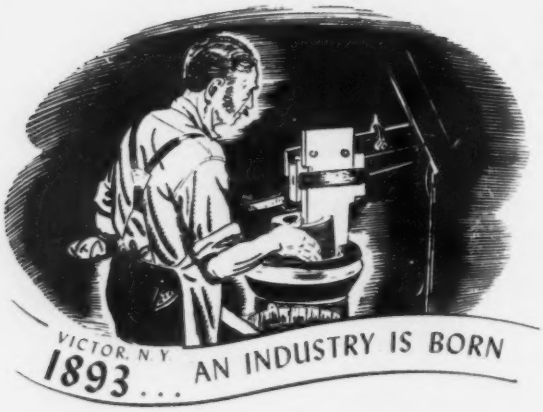
Long clamping section, smooth die-formed U-shaped cable seat and large snubbing radii prevent mechanical damage to conductor.

Light weight, short connecting length, and 6-in. cable-seat-radius at clamp mouth, minimize the effects of conductor vibration.

Each clamp develops more than adequate ultimate strength and will break, without slip, all conductors for which it is offered.

Easily applied . . . come-along loop is provided . . .only one nut need be removed and only one wrench used, except on No. 2116 with its reversible keepers.

THE BREWER-TITCHENER CORPORATION
CORTLAND, N. Y.



1947 VICTOR looks ahead!

DURING the past twelve years Victor has become one of the leaders in the insulator business due to quality of product and dependable deliveries.

As one of the country's main sources of high voltage porcelain, we fully realize our responsibilities to the electrical utilities and manufacturers. Another modern oil-fired kiln is now being installed. Increased production facilities are underway. We are doing our utmost to deserve the confidence placed in us by the industries we serve.

For High Voltage Insulators Look to . . .

VICTOR INSULATORS, INC.

VICTOR, N. Y.

Distributed by MAYDWELL & HARTZELL, INC. • San Francisco • Los Angeles • Seattle • Portland

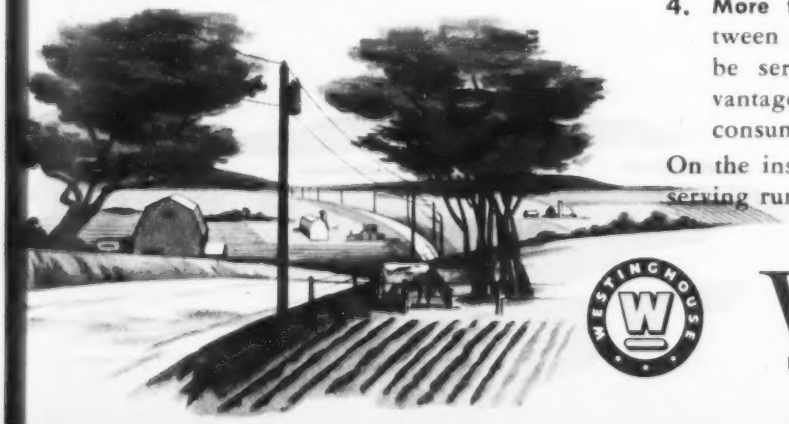
POWER DISTRIBUTION PLANNING

for Better Service Lower Costs...

Rapid load growth, scarcity of electrical apparatus and the lack of time for adequate planning have necessitated piecemeal expansions of many distribution systems. The result has often been lack of co-ordination in the various parts of the system, lowered quality of customer service—and in many cases, resulted in excessive operating costs.

As designer and manufacturer of a complete co-ordinated line *of distribution apparatus, Westinghouse is in an excellent position to offer correlated planning and engineering service—for* any *type of system development or extension.*

This is the first of a series of system layouts, showing how Westinghouse equipment can be applied—to improve system operation, increase reliability of service and reduce system costs.



Farm and rural load growth has exceeded all expectations. In addition, within the next few years, many more farm and rural users will be served with electrical energy. Here's an increase in load on which advance planning should really pay off.

Several characteristics of this load must be considered:

1. **Light load-density.** The peak load per square mile, or per mile of line necessary to reach the loads, is relatively small.
2. **High individual load.** Individual rural users often have several times the peak load of an urban residential consumer.
3. **More miles of line per kva of peak load.** Distance between consumers is many times that of residential consumers—requiring many more feet of line per kva of peak load.
4. **More transformer capacity required.** Distance between consumers usually permits only one user to be served from a distribution transformer. Advantage can seldom be taken of diversity between consumers to reduce transformer capacity need.

On the inside pages are specific recommendations for serving rural areas with maximum economy.

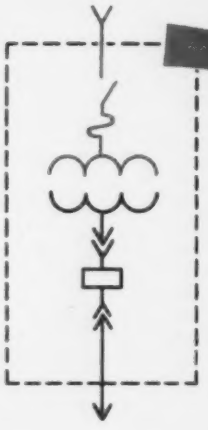
Westinghouse

PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

Simplified System Layout . . .

. . . . dual keys to lower

DISTRIBUTION SUBSTATION

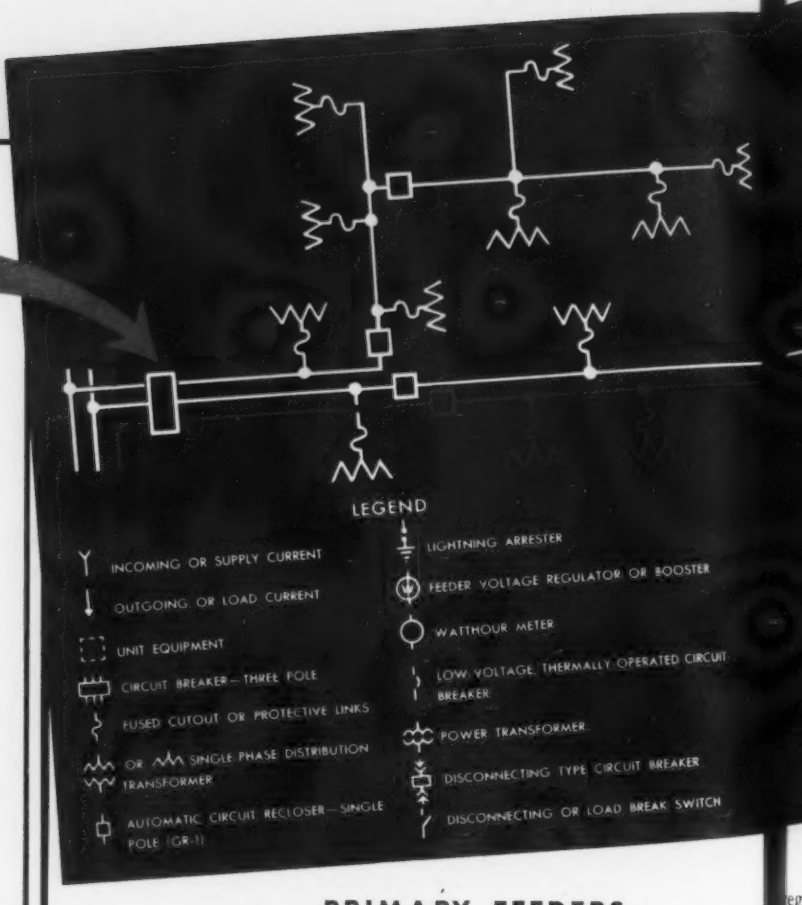


Reliability of the over-all radial system starts right at the substation supplying the power.

In the past it has been necessary to construct conventional substations consisting of transformers and structures for mounting many associated items.

By comparison, the Westinghouse CSP Power Transformer, a self-contained substation, reduces installation cost and increases reliability over the conventional type. This is ideal for any areas requiring a single-feeder substation above 500-kva capacity.

Substations of smaller capacities are of the conventional types requiring power fuses, disconnects, arresters, breakers, etc. Over-all reliability of this type of substation depends upon the quality of these many different, integral parts.

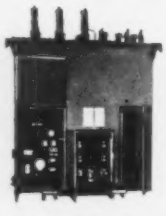


PRIMARY FEEDERS

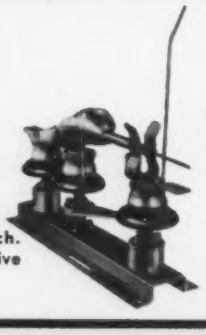
Utilities have found that rural areas are best served by simple radial systems, consisting of one or more primary feeders.

Due to their length in rural areas, these primary feeders are subjected to greater exposure to the elements than any other type of feeder. Still, the first cost, maintenance and operating cost must be kept to a minimum and, at the same time, render high-quality service.

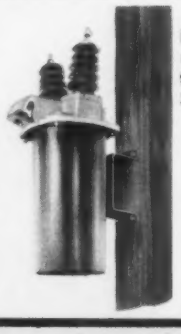
Faults, either temporary or permanent, must disturb a minimum of customers. Proper voltage



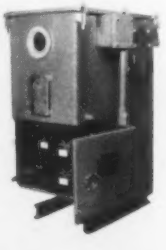
Westinghouse Single-Feeder Substation. Contains CSP Power Transformer and switchgear in preassembled unit. Details in booklet B-3238 and Descriptive Bulletin 48-100.



Westinghouse Type V Disconnecting Switch. Described in booklet B-3480 or Descriptive Bulletin 36-160.



New Westinghouse GR Automatic Circuit Recloser. For details, ask for Descriptive Bulletin 38-680 or booklet B-3906.

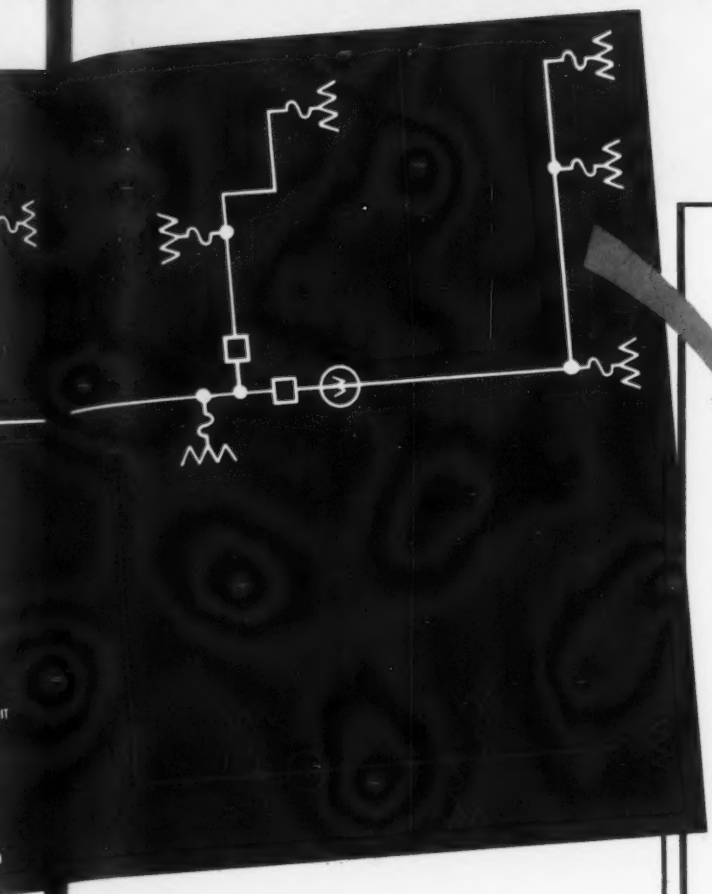


Westinghouse Type LR Booster Voltage Regulator. Described in Catalog Section 47-230. Ask for a copy.

WESTINGHOUSE DISTRIBUTION APPARATUS.

Correlated Quality Equipment

er rural distribution costs

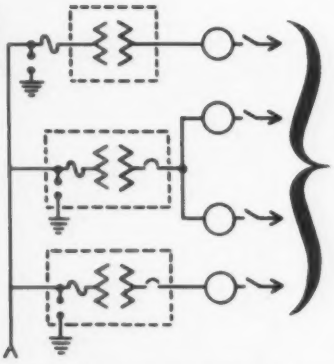


egulation, from the viewpoint of customer re-ations or the operation of their equipment, is ust as important as it is in any other area.

The Westinghouse Type GR Recloser, de-cribed on the next page, properly applied as ndicated above, minimizes the effects of either emporary or permanent faults. Proper co-ordi-nation of reclosers and fuses saves many costly ervice trips.

Westinghouse Type BR or LR Voltage Regu-ators, installed on rural lines, prevent low volt-ge, consequent poor service to customers and oss of revenue.

DISTRIBUTION TRANSFORMERS AND SECONDARY SERVICES

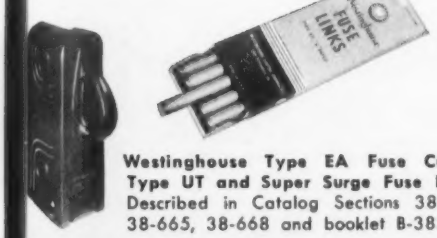


The distribution transformer must be able to take all the punishment that may be delivered to it both from the primary feeder and from the customer services.

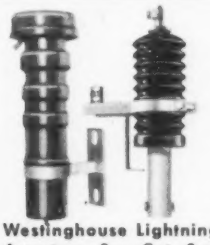
General acceptance of the Westinghouse CSP (Completely Self-Protecting) Distribution Transformer by the majority of operators is evidence that it is best qualified to maintain this connection between the primary feeder and the consumer *at minimum cost.*

In applications involving the conventional use of Transformers, the Westinghouse type "S" Transformer protected by the "EA" drop-out fuse cutout and valve or "De-ion" type arrester is a well co-ordinated combination.

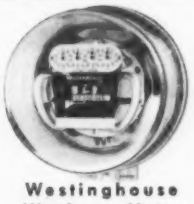
The meter is the cash register of the system. Westinghouse Type CA or CS Meters assure a square deal for both the utility and consumer.



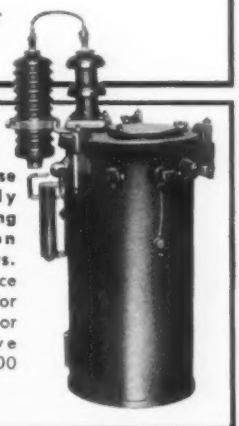
Westinghouse Type EA Fuse Cutout, Type UT and Super Surge Fuse Links. Described in Catalog Sections 38-625, 38-665, 38-668 and booklet B-3833.



Westinghouse Lightning Arresters. See Cat. Sec. 38-140, Descriptive Data 38-205 or booklet B-3417.



Westinghouse Watthour Meter —Details in Catalog Sections 42-000 or booklet B-2247.



Westinghouse Completely Self-Protecting Distribution Transformers. Ask for Price List 46-100 for full details, or Descriptive Bulletin 46-100 CSP.

S. A COMPLETE AND CORRELATED LINE

New GR Reclosers...

WORK 2 WAYS TO CUT YOUR DISTRIBUTION COSTS

GR Reclosers provide a choice between four time-lag tripping operations or 2 fast, followed by 2 time-lag, tripping operations. *And the change from one to the other can be made in a few minutes in the field.* This exclusive GR feature enables you to establish better co-ordination between reclosers—and between reclosers and fuses—than heretofore possible. The result is a minimum of system miles affected by any fault . . . a minimum of outage time on all parts of the system including long, lightly loaded lines where faults are common and service trips costly.

These Features...

- **Choice** of all time-delay trips or 2 fast and 2 time-delay trips (quick change-over in the field).
- **Dead tank construction**—no live parts exposed.
- **Time-delay tripping** on reclosing after lockout.
- **Direct-drive mechanical integration** . . . no pumps . . . no clockwork.
- **Self-protection**—no coil burnouts from overload or lightning.

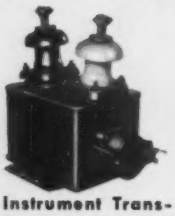
...mean these advantages!

- **Positive co-ordination** of a series of as many as seven reclosers—or reclosers and fuses.
- **High-speed (12-cycle) reclosing** after first fast opening.
- **No unnecessary tripping** on momentary overloads.
- **Line pick-up after lockout** without by-pass switch.
- **Minimum** of system miles affected by any fault.

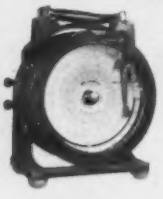
Other items in the COMPLETE Westinghouse line of Distribution Apparatus

Type DBA (Drop-out Boric Acid) Fuses. Price List 36-325 or booklet B-3419.

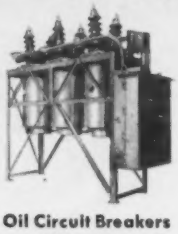
Capacitors for power-factor correction. Catalog Sections 49-000 or booklet B-3204.



Instrument Transformers for all metering and relaying. Catalog Sections 45-000.



Instruments for any purpose. See Catalog Sections 43-000.



Oil Circuit Breakers—outdoor, automatic reclosing type. Catalog Sections 33-752.

Street Lighting—Complete equipment of all types. Catalog Sections 60-000.

HERE'S CONSTRUCTIVE HELP FOR DEVELOPING RURAL LOADS

For maximum use and enjoyment of electricity on the farm, wiring must be adequate. This fact-filled, 44-page book has been compiled as a guide for utilities to help farm dealers, wiring contractors and farmers in planning adequate farm wiring to take care of requirements. It contains helpful data on voltage drop, wiring plans and uses of electrical equipment, which is useful to County Agents, Vocational and Agricultural teachers and utility farm power engineers. It is available, at low cost, for use by utilities. Write for sample copy. Westinghouse Electric Corporation, P.O. Box 868, Pittsburgh 30, Pa. J-97121

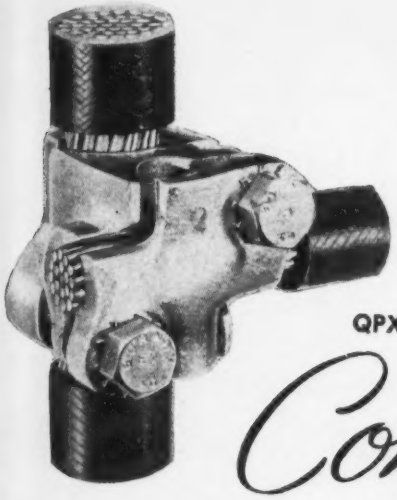
Litho in U.S.A.

Westinghouse

PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

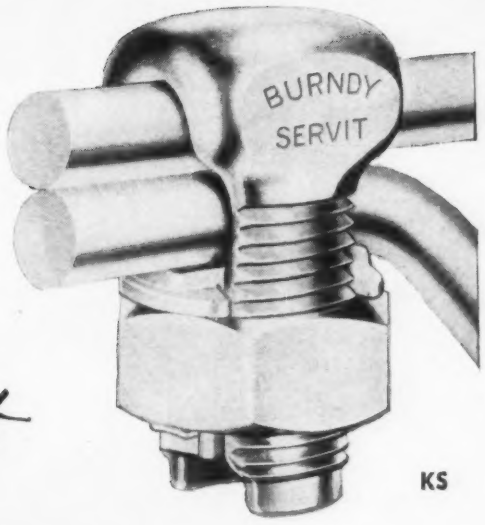
DISTRIBUTION APPARATUS

A COMPLETE AND CORRELATED LINE



QPX

Connect with



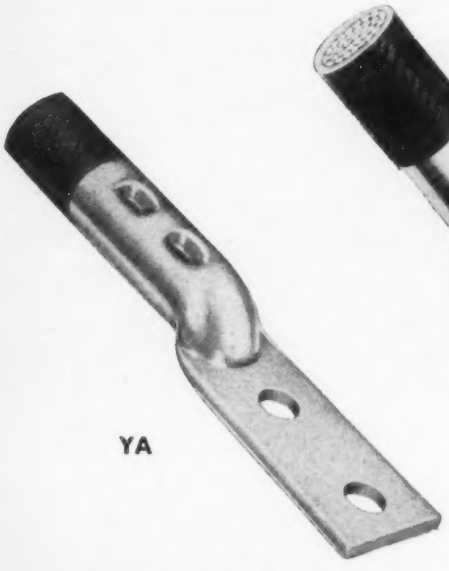
KS

BURNDY

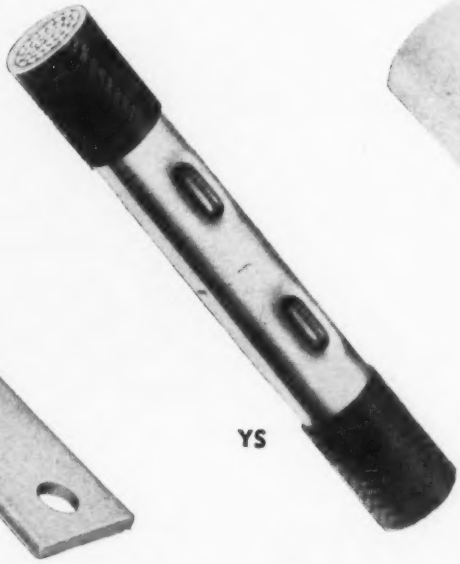
★ Because — you can always depend on the variety of Burndy connectors to provide quick, economical and highly efficient electrical connections.

This dependability stems from Burndy's long leadership in the electrical connector field . . . which has resulted in the acceptance of Burndy connectors for all construction and maintenance requirements. Remember too, deliveries are good at Burndy. Do you have the latest Burndy Catalog?

QT



YA



YS

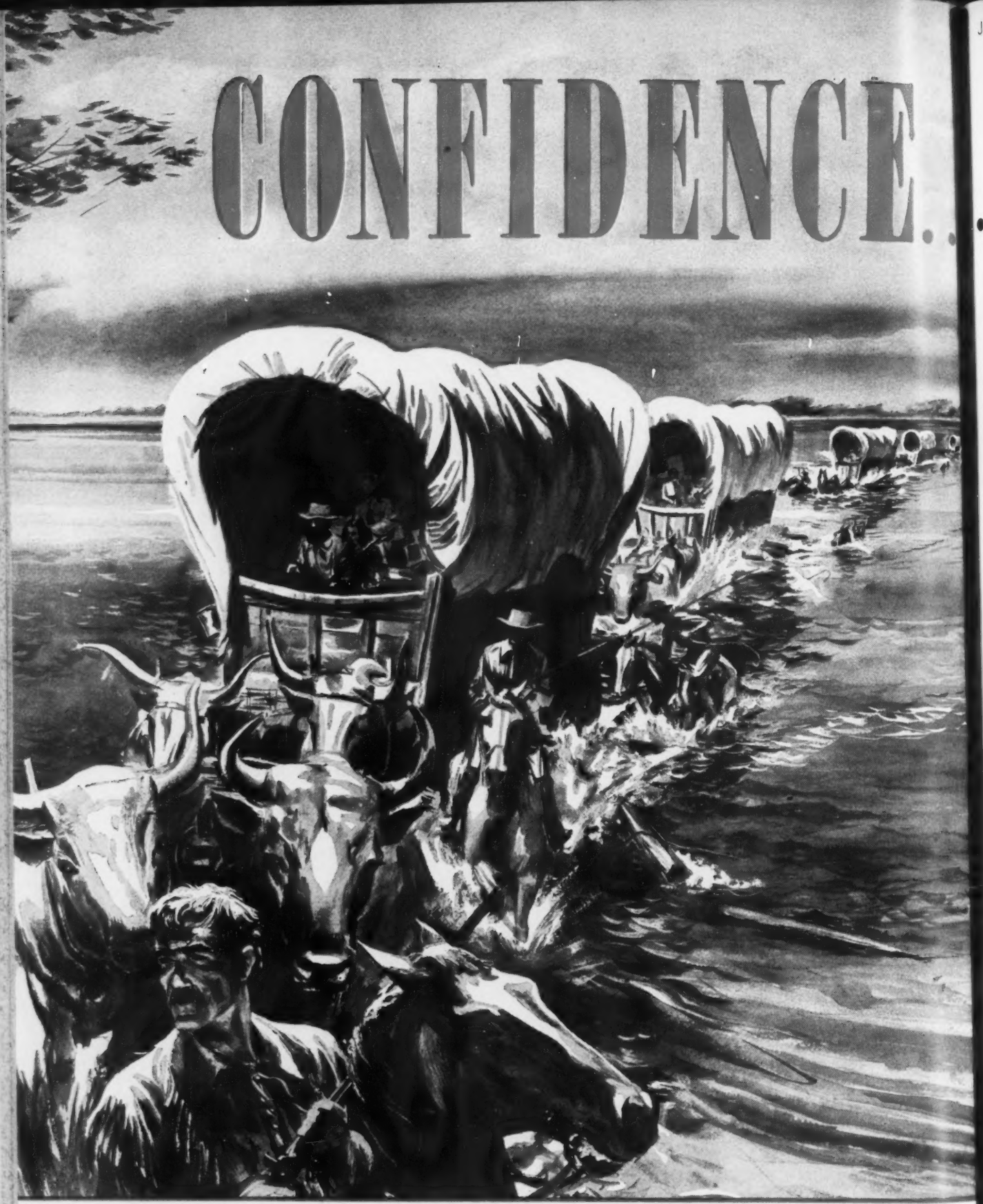
QA

BURNDY · New York 54, N.Y.

IN CANADA: Canadian Line Materials, Limited, Toronto 13
FOREIGN: Philips Export Corporation, New York 17, N. Y.

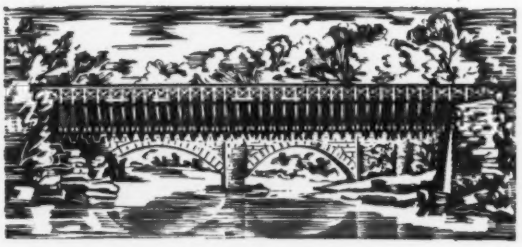
WESTERN BRANCH · VERNON, CALIFORNIA

CONFIDENCE..



Manufacturers of Wire Rope and Strand • Fittings • Slings • Screen, Hardware and Industrial Wire Cloth • Aerial Wire Rope Systems
Hard, Annealed or Tempered High and Low Carbon Fine and Specialty Wire, Flat Wire, Cold Rolled Strip and Cold Rolled Spring Steel • Ski Lifts

.....how much is it worth?



IN 1844, three years before Alexander Graham Bell was born, and long before the first Prairie-Schooner crossed the Mississippi River, John August Roebling's confidence in the suspension principle of construction so impressed the engineers of the State of Pennsylvania, that they authorized him to build the world's first suspension aqueduct.

How much is his confidence worth to all the thousands of engineers who followed and to humanity in general that have benefited from his pioneering venture?

And how much is the confidence of the John A. Roebling's Sons Company in the future of American industry worth to you, that keeps Roebling development and Roebling products in the lead?

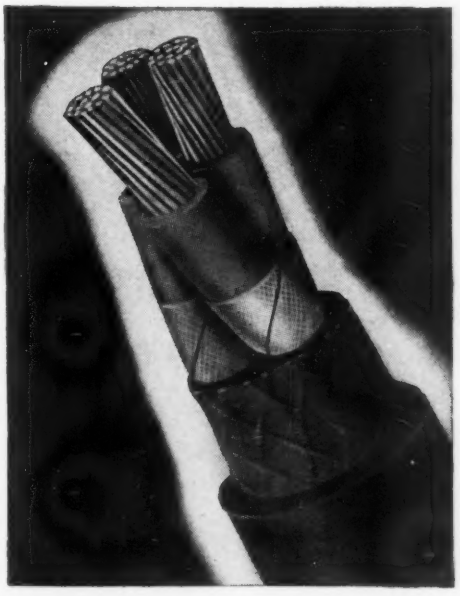
Roebling's greatest asset is your confidence in Roebling and its confidence in your future. That is why Roebling's every effort is dedicated to the preservation of this confidence—your's and Roebling's.

FOR PERFORMANCE . . . ELECTRICAL CONTRACTORS TURN WITH CONFIDENCE TO ROEBLING PARKWAY CABLES

AS WITH any product, the final test of Roebling Parkway Cables is performance. But the confidence with which electrical contractors specify Roebling cables means their performance can be predicted—in advance.

A typical example is Roebling Roesheath (Type RR), a non-metallic Parkway Cable made for direct burial . . . and widely used for general power supply and distribution circuits where severe soil conditions prevail. It's made of the finest available materials . . . in single or multiple conductors . . . in a wide range of sizes . . . with or without ground wires. It's soundly designed and engineered. It is the best Roebling knows how to make.

And not only the cable commands your confidence. At Roebling, product and service go hand in hand. Experienced engineering service will help you get *all* the dependability and long life you pay for. Just call our nearest branch office and talk to your Roebling Field Engineer.



JOHN A. ROEBLING'S SONS COMPANY
OF CALIFORNIA

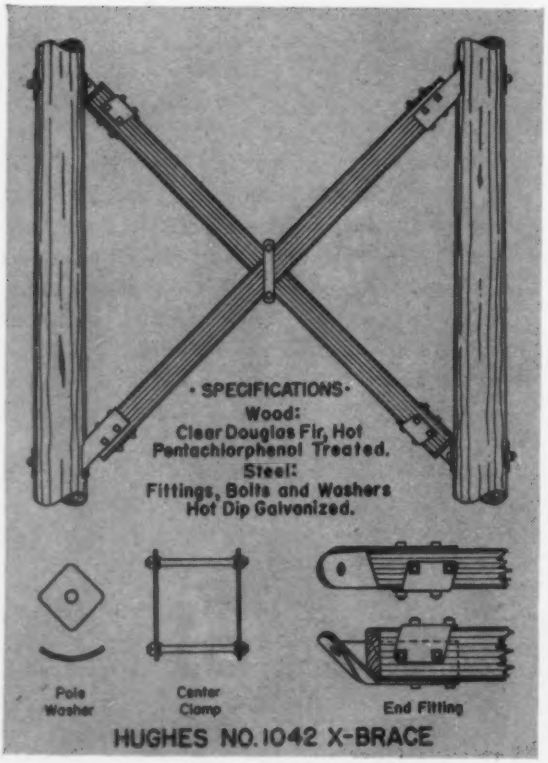
San Francisco • Los Angeles • Seattle • Portland

Electrical Wire and Cable • Suspension Bridges and Cables
Aircord, Aircord Terminals and Air Controls • Lawn Mowers

ROEBLING

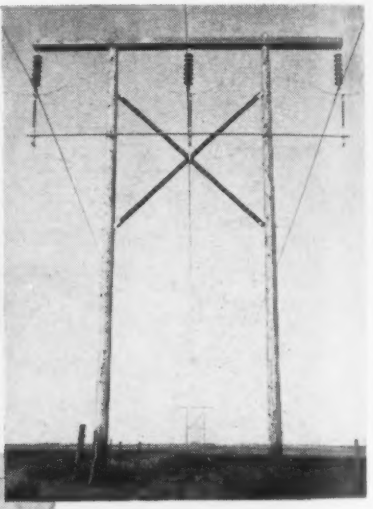
A CENTURY OF CONFIDENCE

HUGHES *Wood X-Braces* FOR TRANSMISSION STRUCTURES

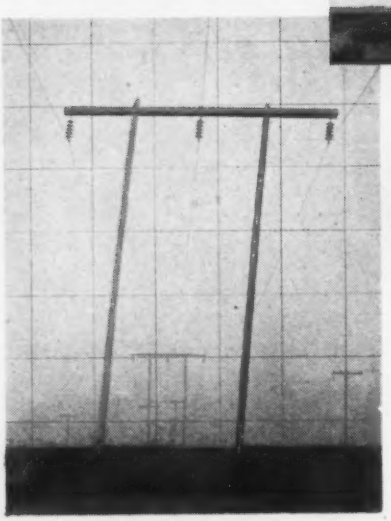


HUGHES Wood X-Braces have made possible the desire of Design Engineers for an economical, structurally sound transmission line. HUGHES X-Braces combine the economical features of wood poles and arms with structural advantages found earlier only in steel towers.

Illustrated below are two contrasting structures, the braced structure with longer spans required no maintenance, whereas the unbraced structure usually required continual attention.



AFTER 11 YEARS IN HEAVY LOADING DISTRICT



AFTER 10 YEARS IN LIGHT LOADING DISTRICT

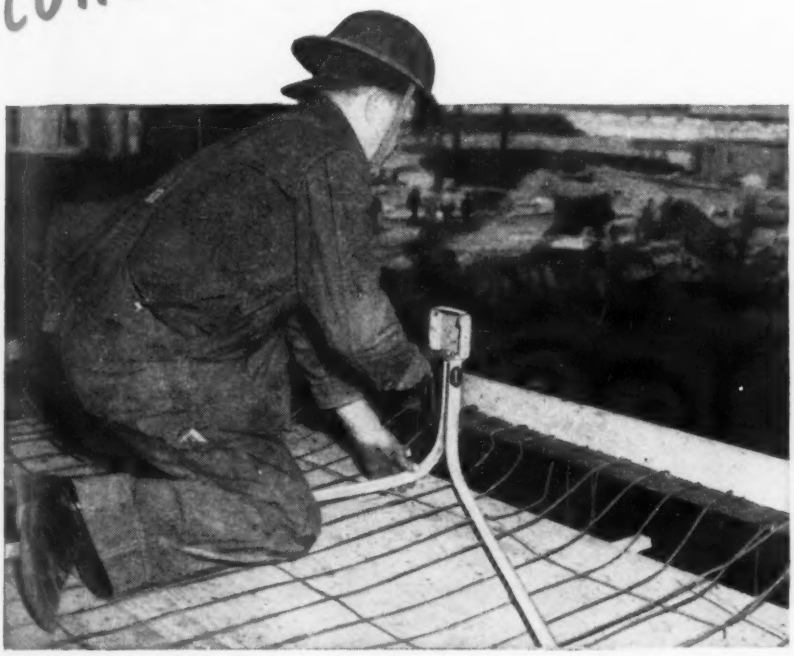
Many Transmission and Operating Engineers are rehabilitating existing lines and increasing safety factors by installing X-Braces to existing construction; thus extending the life of the line.

For your individual requirements, consult HUGHES Engineering Department.

HUGHES BROTHERS
SEWARD, NEBRASKA
FOUNDED - 1921
INCORPORATED
"HUGHES" TRANSMISSION & DISTRIBUTION MATERIAL MFRS. WOOD METAL

A TIP ON CONSTRUCTION FROM THE MEN ON THE JOB

CONDUIT FOR CONSTRUCTION SPEED!



Men who work with rigid conduit know what it takes for real construction speed. That's why they like to work with easy-handling General Electric conduit. It threads easily, bends true, lasts long. These advantages make General Electric conduit important to you—important, because it helps get jobs done fast, helps get them done right. For security and speed in wiring installations, remember to specify General Electric conduit.

AND CONDUIT GOES IN TO STAY

GENERAL ELECTRIC WHITE is hot-dipped inside and out with high-quality zinc. Laboratory and field tests prove that this finish gives the best protection against atmospheric corrosion. In addition, G-E White is coated with a baked-on Glyptal* lacquer finish, to form a smooth, hard surface for easy wire pulling.

GENERAL ELECTRIC BLACK, coated with a heavy, enamel finish, is a rigid conduit specifically made to resist the attacks of chemical corrosion. It's ideal for installations where liquid chemicals, fumes, acids, and oils are a threat, and where humidity is low.

Get complete details from your General Electric Distributor, or write to Section C55-625, Appliance and Merchandise Department, General Electric Company, Bridgeport 2, Connecticut.

*Trade-mark Reg. U.S. Pat. Off.

GENERAL ELECTRIC

RACEWAYS ROUND-UP

from your

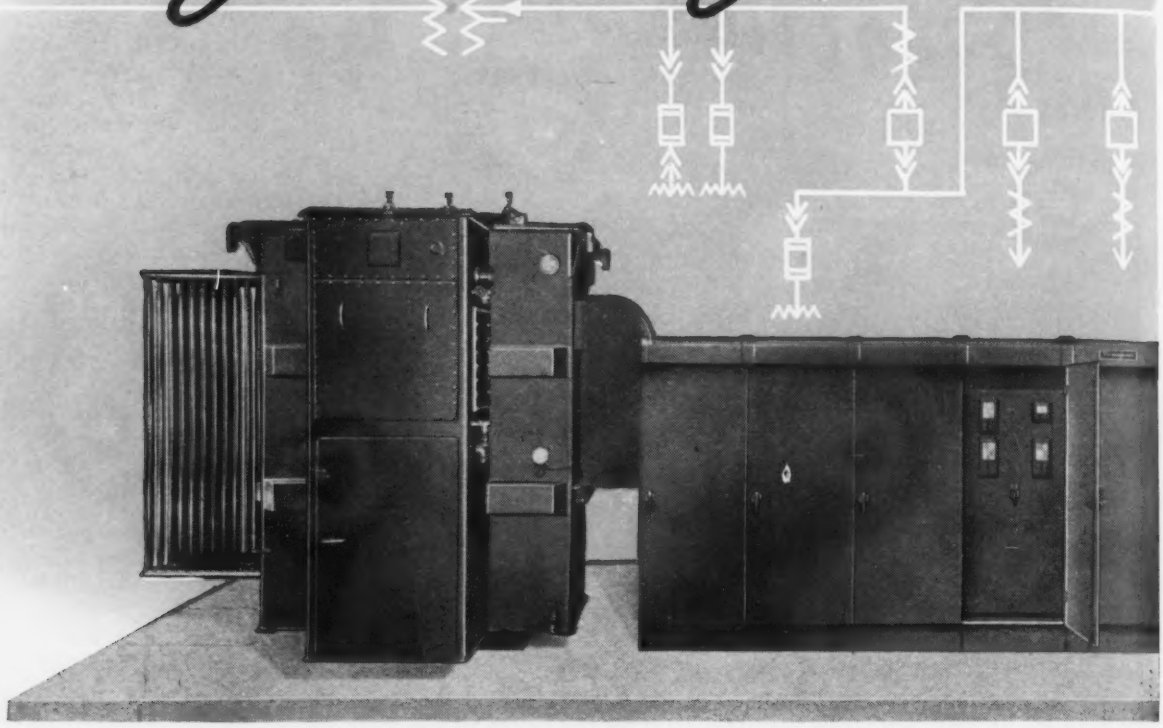
Merchandise Distributor

For everything in raceways, your best bet, as always, is General Electric. You can rely on this complete line to meet any construction need—for big jobs as well as small ones. When you need information on raceways and accessories, your General Electric Merchandise Distributor is always ready to help you. If you want engineering assistance on underfloor distribution, you can get it from one of General Electric's field force of underfloor experts. Get the habit of calling on General Electric for latest raceways information.

Now you can put an end to the annoying need for specifying several types of bar hangers. The General Electric S-type bar hanger fits anywhere, goes in place easily where studs are on centers up to 24 inches. Users say the General Electric S-type hanger speeds and simplifies box installation.

For wiring flexibility in concrete office buildings, plants, hospitals, and for other construction jobs where provisions must be made for varying wiring needs, look into the advantages of Fiberduct underfloor raceways. These nonmetallic, corrosion-proof ducts permit installation of new outlets anywhere in the duct at any time. Buildings equipped with Fiberduct stay electrically young. See us for details.

Plan your load growth



WESTINGHOUSE CAN SUPPLY UNIT SUBSTATIONS AND RELATED EQUIPMENT FOR ANY SYSTEM REQUIREMENT

Westinghouse Unit Substations not only meet today's demands . . . they provide the necessary *flexibility* for future changes in load requirements.

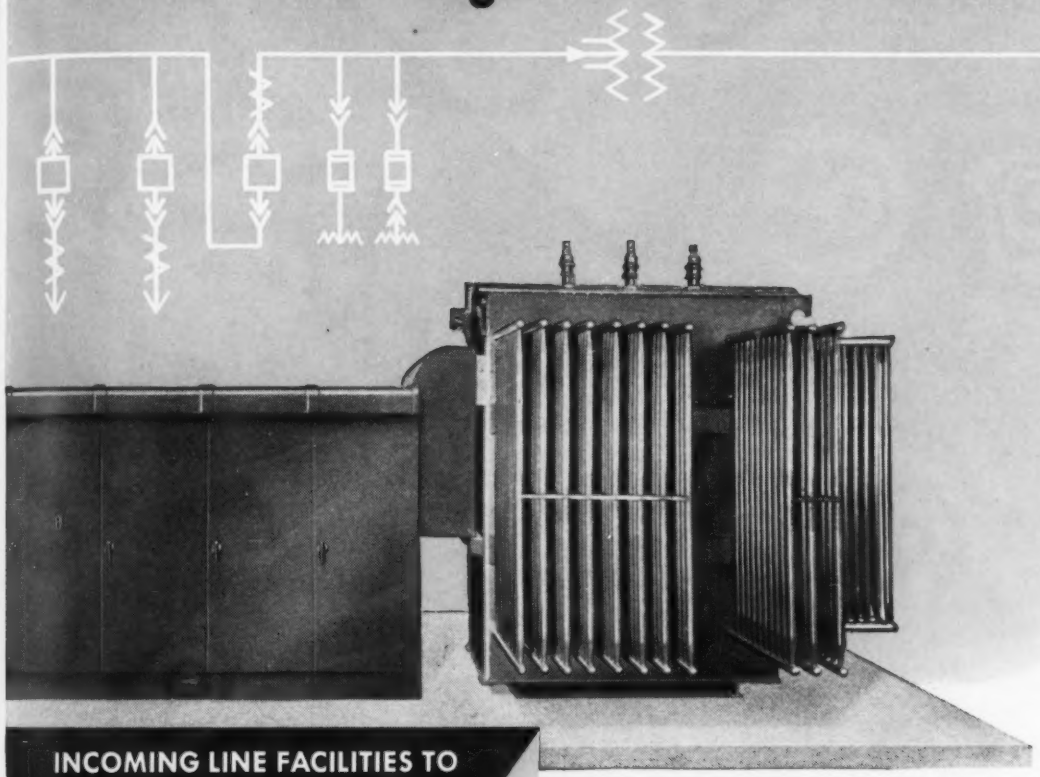
Due to their compactness and "Unitized" type of construction, they can be moved easily to new locations that may be required by any change in the center of the load . . . with 100% salvage value. Further new substation units can be added to accommodate any load growth. Built-in tap changing under load is provided. Because of their flexibility and adaptability, they are applicable to either the radial or network distribution systems.

The double-ended Unit Substation (above) assures greatly improved service continuity. It provides a power supply from two sources. An outage at one source will not interrupt service.

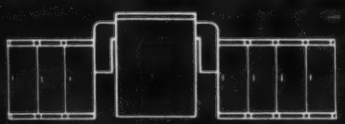
It will pay you to investigate the advantages of self-contained, self-protected Westinghouse Unit Substations. Call your nearest Westinghouse office or write for B-3238, Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa. J-97124

Westinghouse
PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE
UNIT SUBSTATIONS FOR ANY SYSTEM

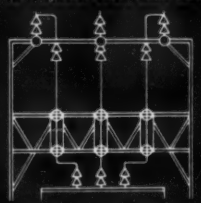
...with Westinghouse Unit Substations



INCOMING LINE FACILITIES TO MEET EVERY REQUIREMENT...



—When required Unit Substations can be supplied with coordinated, metal clad, "Unitized" switchgear for incoming power supplies of 13,800 volts and below.



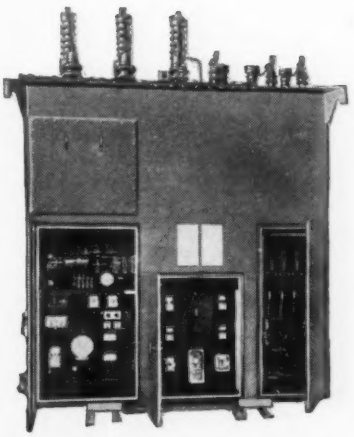
—Prefabricated overhead incoming line structures.

—Transformer mounted terminal chambers or switches for use with underground cables.

ADD UP THESE *Advantages*

YOUR ANSWERS TO BETTER DISTRIBUTION PLANNING.

1. **Modern and Pleasing in Appearance.**
2. **Compact**—saves space.
3. **Minimum Installation Time and Cost.**
4. **Improved Service Continuity.**
5. **Low-Cost Maintenance**—operating parts easily accessible.
6. **Undivided Responsibility**—all equipment supplied by one manufacturer.
7. **Full Co-ordination**—electrically and mechanically.
8. **High Salvage Value**—entire substation can be easily moved.



FOR SINGLE-FEEDER SUBSTATIONS

● . . . the last word in "Packaged Power"—The Westinghouse CSP Power Transformer combines compactness, "eye-appeal", and performs all the functions of a conventional substation; transformation, voltage regulation, metering and protection.

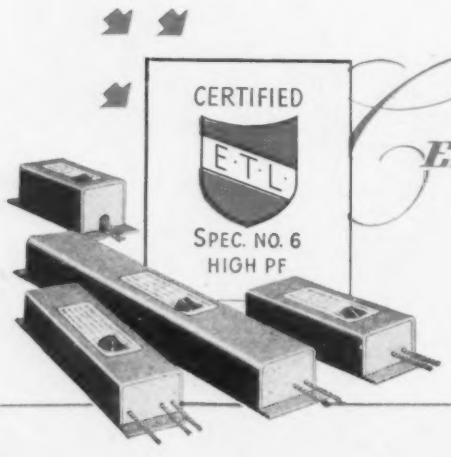
"IF YOU WANT TOP PERFORMANCE FROM THIS FLUORESCENT TUBE....

YOU'LL GET IT WITH THIS CERTIFIED BALLAST!"

The word "CERTIFIED" on a fluorescent lamp ballast tells you instantly that here is a product that gives you the greatest possible efficiency in operation and performance of fluorescent lighting.

Leading ballast makers and lighting engineers put together a set of exacting specifications that assure quiet operation, proper ballast temperatures, most light and longer life from fluorescent lamps. Famous Electrical Testing Laboratories, Inc. test, check and re-check CERTIFIED BALLASTS against these specifications . . . give it the ETL mark of approval. Insist on CERTIFIED BALLASTS in the fluorescent lighting equipment you sell . . . give your customers the protection they need and want.

CERTIFIED FLEUR-O-LIER MANUFACTURERS, RLM STANDARDS INSTITUTE and CERTIFIED LAMP MAKERS have solved their ballast problems by writing CERTIFIED BALLASTS into their specifications.



CERTIFIED BALLAST MANUFACTURERS

Makers of Certified Ballasts for Fluorescent Lighting Fixtures

Acme Electric Corporation, Cuba, New York
Chicago Transformer Div., Essex Wire Corporation, 3501 Addison St., Chicago, Illinois
General Electric Co., Specialty Transformer Division, Fort Wayne, Ind.
Jefferson Electric Co., Bellwood, Illinois
Sola Electric Co., 2525 Clybourn Avenue, Chicago 14, Illinois
Starring and Company, Bridgeport, Conn.
Wheeler Insulated Wire Co., 378 Washington Ave., Bridgeport, Conn.

TRUMBULL (T) ELECTRIC

DISTRIBUTORS

...cover the Country...*for your convenience!*

The Trumbull distribution set-up is the outgrowth of careful initial selection and a continuous development and training program. We can truthfully say that our 333 Electrical Wholesalers, with their thousands of men, are well schooled in the Trumbull line . . . are exceptionally able and willing to give you the technical information required for modern electrical installations.

The Architect, whose specifications call for reliability, compactness, appearance . . . the Electrical Engineer who has specific problems to solve . . . the Contractor who wants delivery and competitive prices . . . the Production Manager who seeks cost cutting equipment, better power distribution and control, lower maintenance . . . all need localized service.

Trumbull Authorized Electrical Wholesalers will give it to them . . . from Maine to Miami —from San Diego to Seattle—in every important center from coast to coast.

Forty-eight years ago the Trumbull "Line" was *one* product . . . today it is complete . . . from the simple, inexpensive disconnect switch to interconnected Busways that distribute current throughout the largest industrial plants.

Whatever your requirements, wherever you are, there's an Authorized Trumbull Electric Wholesaler ready to serve you well.

THE TRUMBULL ELECTRIC MANUFACTURING COMPANY
PLAINVILLE, CONNECTICUT

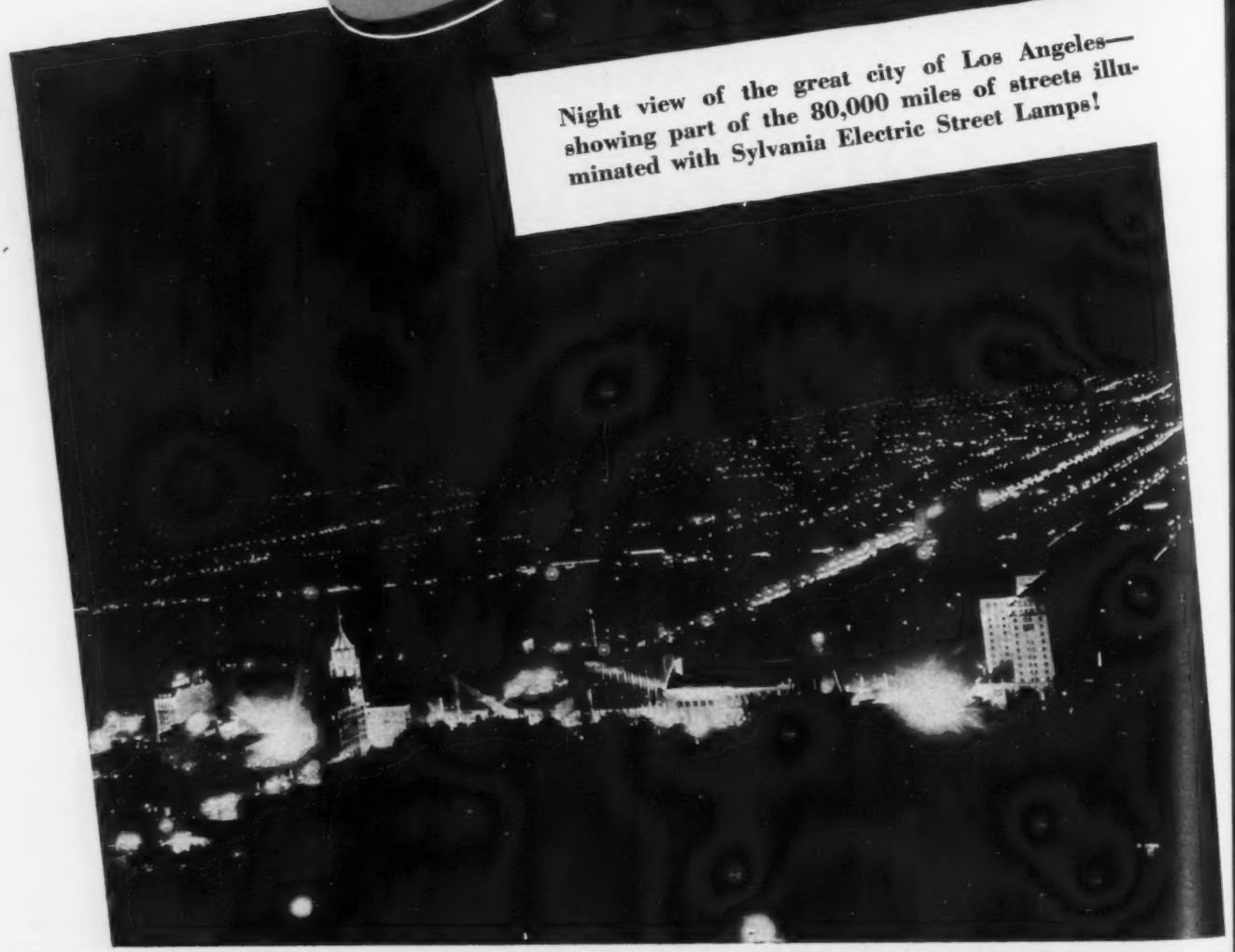
OTHER FACTORIES AT NORWOOD, OHIO • LOS ANGELES • SAN FRANCISCO • SEATTLE

LOS ANGELES! MILWAUKEE!

—FOUR OF THE NUMEROUS CITIES AND TOWNS THAT ARE EFFECTIVELY

ILLUMINATED WITH SYLVANIA

Street



Night view of the great city of Los Angeles—showing part of the 80,000 miles of streets illuminated with Sylvania Electric Street Lamps!

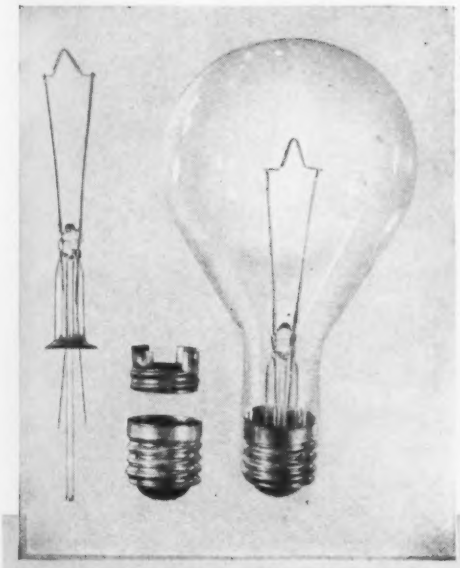
SYLVANIA

MAKERS OF FLUORESCENT LAMPS, FIXTURES, WIRING DEVICES; ELECTRIC

NEW YORK! BOSTON!

Lamps—

North, South, East, West—through every type city and town—Sylvania Street Lamps make for a brighter America. Municipal governments, power stations, contractors know full well that they are dealing with a product of unsurpassed efficiency and durability when they specify Sylvania Street Lamps for their communities.



The parts of Sylvania's Street Series Lamps shown here are subjected to the most rigid examinations and tests through every stage of their production. Every precaution known is utilized to guarantee a street lamp unsurpassed in quality.

This is a view of the Wire Department. Here experts examine through microscopes the filament of each Sylvania lamp to make certain only the most perfect material is used.

The girl in this picture is operating a Photometer. This is one of the precise checks on the light output as well as the power consumption of Sylvania Street Lamps.

The photographs on this page indicate only three of the many steps taken to make Sylvania Street Lamps metallurgically, mechanically, and electrically unsurpassed!

SYLVANIA ELECTRIC PRODUCTS INC., 500 Fifth Avenue, New York 18, N. Y.

ELECTRIC

LIGHT BULBS; RADIO TUBES; CATHODE RAY TUBES; ELECTRONIC DEVICES

How RLM Standards Institute Helps BUYERS and SPECIFIERS

Measure Values

IN INDUSTRIAL LIGHTING EQUIPMENT

SPECIFICATIONS . . . . . The procedure for developing an RLM Standard Specification requires a thorough investigation and report by a Technical Committee of the Institute, guided by the findings of the Illuminating Engineering Society and other recognized industry associations. These specifications are available without charge to everyone interested.

INSPECTION . . . . . A rigid inspection and testing system, conducted by Electrical Testing Laboratories, Inc. a wholly independent testing organization . . . provides positive assurance that RLM certified Industrial Lighting Units conform to RLM rigid standards of efficiency and economy.

CERTIFICATION . . . . . When equipment so inspected and tested conforms to RLM specifications, the laboratory issues a label of compliance. When you find this RLM LABEL affixed to an industrial lighting unit you know that it has been manufactured in compliance with the exacting procedure developed and administered by RLM Standards Institute.

The RLM Standards Institute is a non-profit organization. Any manufacturer of Industrial lighting equipment may at his own initiative, if he so desires, submit his equipment for RLM inspection and certification. He need not become a member of the Institute. It is only necessary for him to assume his equitable share of the cost of operating the program.

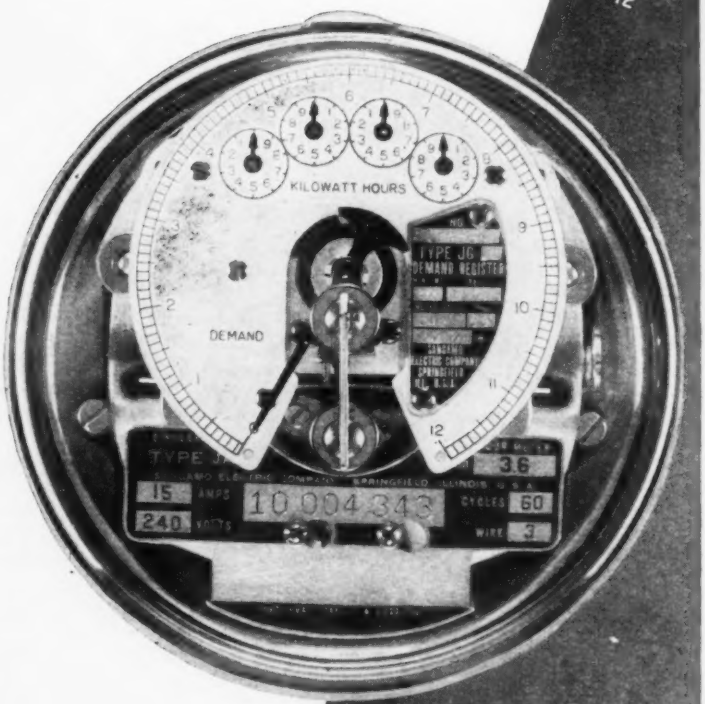
The lettters RLM Stand for Reflector and Lighting Equipment Manufacturers

RLM STANDARDS INSTITUTE
INCORPORATED

307 N. MICHIGAN AVE. SUITE 420 • CHICAGO 1, ILLINOIS

measured DEMAND

the direct basis of billing for fixed charges..



Type JS with JG Demand Register

Longer hours of use and improved operating efficiencies have resulted in the present low price of the kilowatthour. However, unless load factors are further improved, today's high costs will not permit satisfactory operations at present low rates.

MEASURED DEMAND helps to solve this problem by encouraging your customers to improve their load factor. MEASURED DEMAND also provides the most direct basis of billing for fixed charges. An extensive line of Sangamo Demand Instruments is available to meet your specific need FOR ALL CLASSES OF SERVICE.

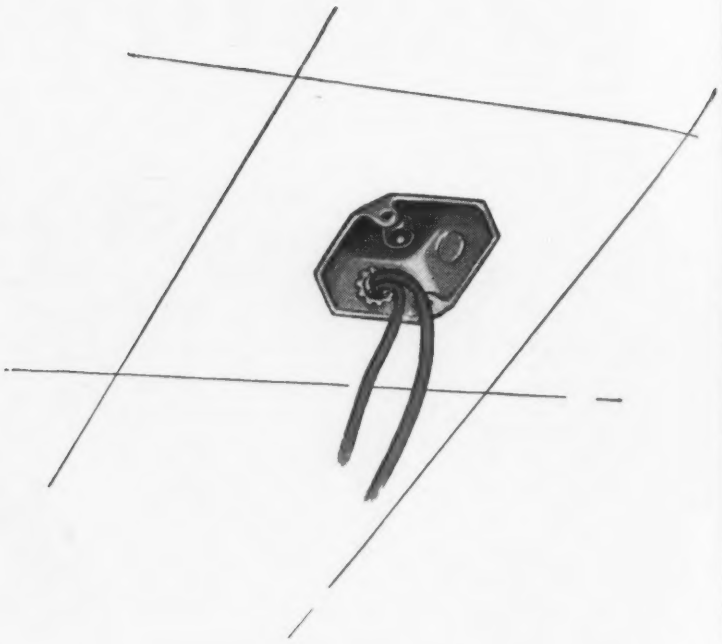
Sangamo Type JS meter with JG Demand Register for measurement of singlephase kilowatthours and kilowatt demand where a simple, compact, and economical unit is required. The Type JG Demand Register can also be supplied separately for existing meters.

Type JW5

Type LC-2-P With LG Demand Register

Type JW5 combination watthour and Lincoln watt demand meter for measurement of demand on singlephase circuits on the thermal principle. Type LC-2-P meter with LC Demand Register for measurement of demand on polyphase circuits.

SANGAMO ELECTRIC COMPANY
SPRINGFIELD • ILLINOIS



Look Before You Light

look for modern, functional fixture design
look for lasting lighting efficiency
look for easy, low-cost maintenance.

VIZ-AID is attractively styled in quiet, good taste. It is optically engineered to give years of high-intensity, even, glare-free light. It is structurally designed for quick, economical cleaning and servicing.

Send for Bulletin 10-B-1.

The VIZ-AID

For ceiling or suspension mounting—unit or continuous installation. Designed for two 40- or two 100-watt lamps. U. S. Patent Nos. D-138990, D-143641 and 2411952.

Day-Brite Lighting, Inc., 5412 Bulwer Avenue, St. Louis 7, Mo.
Nationally distributed through leading electrical supply houses.
In Canada: address all inquiries to Amalgamated Electric Corp., Ltd., Toronto 6, Ont.

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IT'S EASY TO SEE WHEN IT'S

DAY-BRITE *Lighting*

CERTIFIED STARTERS

...for better fluorescent lighting performance
...for economy in maintenance

In offices, stores or factories . . . wherever large numbers of fluorescent lighting fixtures constitute a maintenance problem, CERTIFIED STARTERS produce *real* economies.

CERTIFIED STARTERS are tested, checked and *certified* by famous Electrical Testing Laboratories, Inc., as meeting rigid specifications for performance and service. That means more light from lamps, longer lamp life, longer starter life. Be sure the starters you sell or use carry the familiar "ETL CERTIFIED" shield!

CERTIFIED
E·T·L·
SPEC. NO. 6
HIGH PF

● Be sure they're CERTIFIED... look for this mark stamped on the case.

Address inquiries to any of the following manufacturers of

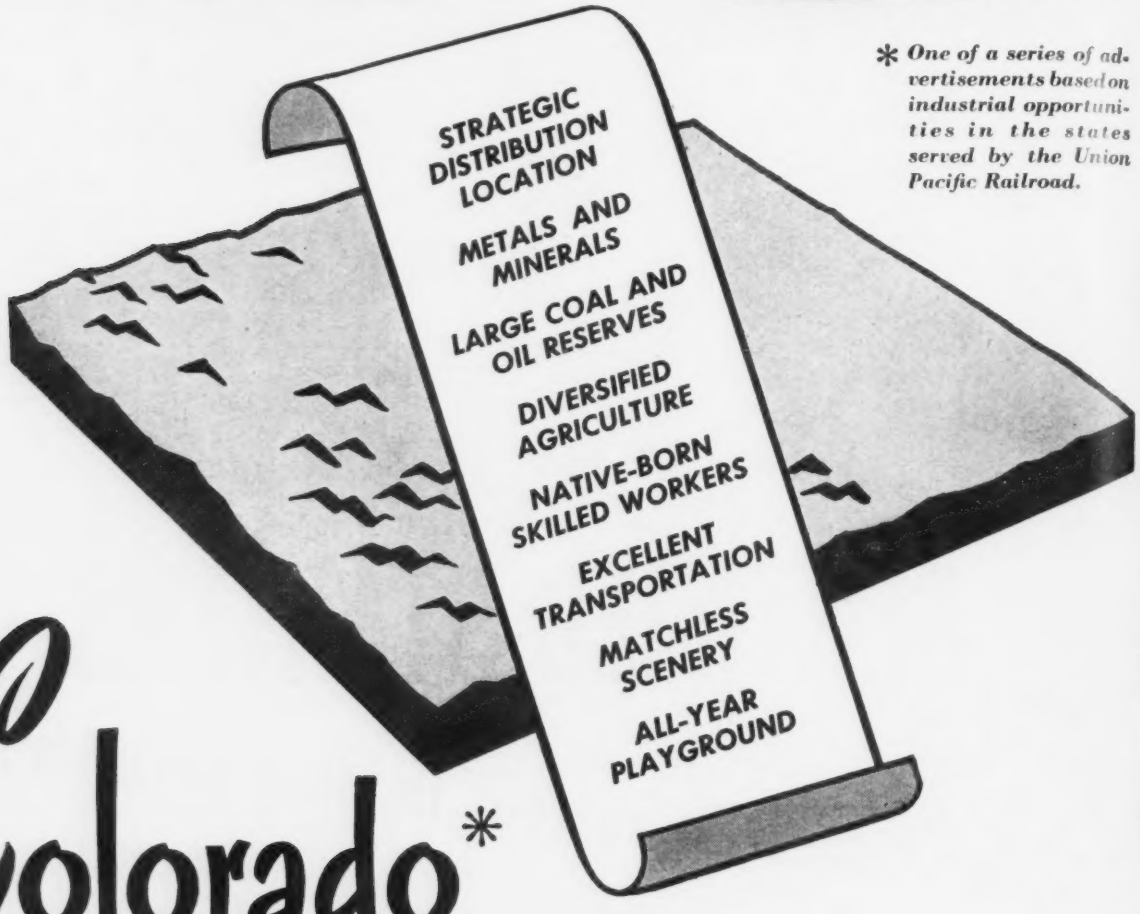
Certified Starters

The Arrow-Hart and Hegeman Co., Hartford, Connecticut
The Bryant Electric Co., Bridgeport, Connecticut
Dura Electric Lamp Co., Newark, N. J.
General Electric Co., Bridgeport, Connecticut
Harvey Hubbell, Inc., Bridgeport, Connecticut
Instant Glow Starter Corporation, New York, N. Y.
Kuthe Laboratories, Inc., Newark, N. J.
The Lloyd Products Co., Providence, R. I.
Pass & Seymour Co., Syracuse, N. Y.
Sheldon Electric Co., Irvington, N. J.

UNION PACIFIC

TREASURE MAP OF INDUSTRY

* *One of a series of advertisements based on industrial opportunities in the states served by the Union Pacific Railroad.*



Colorado*

Colorado offers industry many desirable sites for manufacture, distribution, warehousing, and other purposes. It is strategically located for national distribution.

Diversified agricultural products are of high quality due to favorable climate and soil.

More than 250 useful metallic and non-metallic minerals and compounds have been found, including precious uranium. Timber, oil and coal are practically unlimited.

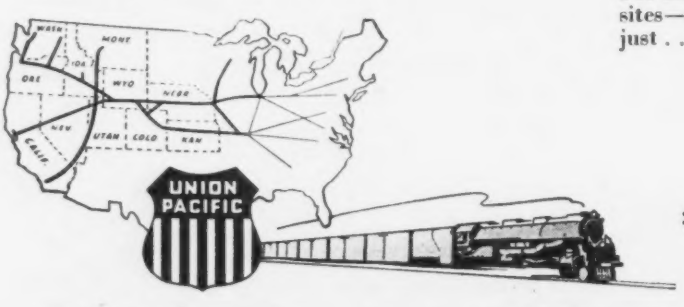
Native-born skilled labor, and a healthful climate resulting in fewer "time-outs" assure economical production.

Colorado provides sound state economy, modern educational and cultural facilities.

Thousands of vacationists enjoy its mountainous splendor, cool summer breezes and winter sports.

Union Pacific provides Colorado with unexcelled freight and passenger transportation. Every night, over night Streamliner service between Denver-Chicago . . . Denver-St. Louis.

For assistance in securing industrial and commercial sites—and for all-weather, dependable rail service, just . . .



be Specific – say "Union Pacific"

* *Address Industrial Department, Union Pacific Railroad, Omaha 2, Nebraska, for information regarding industrial sites.*

UNION PACIFIC RAILROAD

THE STRATEGIC MIDDLE ROUTE

No. 6

ad-
don
uni-
ates
nion

put Lightolier's profit plan to work for you

Lightolier's Profit Plan gives you the practical tools that will build your business and increase your profits. Never before in the history of the decorative lighting industry has the opportunity for *you* been so great. Let Lightolier help you turn that opportunity into money in the bank.

consumer advertising:

Lightolier is now running the biggest national campaign in the history of the lighting business—colorful full pages in magazines of major importance that *pre-sell Lightolier merchandise for you.*

trade advertising:

Full pages that hit hard and often to create more sales for you through architects, decorators and builders...that bring you the latest news of Lightolier merchandise and Lightolier selling helps.

consumer-selling book:

Ten of America's most famous decorators created the settings for the new, *full color* CHARM BOOK...It shows your customers that finer fixtures mean better lighting and decoration...making this well-known selling tool more profitable for you than ever before.

free lighting advisory service:

...that's the best selling phrase in this business. Lightolier's LIGHTING GUIDE boils down to easy, usable form the important technical and decorative data you need to render this service...for bigger sales, larger profits, and happier customers.

display and selling tips:

Lightolier will send you a steady stream of practical, business-building suggestions for selling and display...pre-tested in the nation's largest consumer showrooms...to attract more customers *your* way.

business-building emblem:

Cash in on America's leading name in decorative lighting...the largest advertising campaign to consumers, architects, decorators and builders in lighting fixture history...the styles and advisory service consumers want... by displaying the LIGHTOLIER AUTHORIZED DEALER EMBLEM

...and with

LIGHTOLIER'S beautiful and exciting fixtures for every room in the home ...from new lighting devices in elegant crystal to America's finest designs in fluorescent...including

Bel Vista Lightoliers

an exciting new series for every room...for every home!

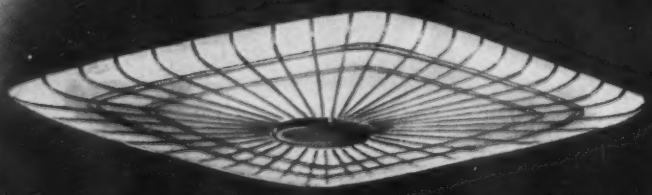
Bel Vista Series by LIGHTOLIER

...an exciting new group of fixtures for every major location, architectural style, and decorative period—the newest fashion in lighting...in colors, shapes and sizes to go with home furnishings of today and tomorrow. Illustrated are just some of the designs that make Bel Vista a complete line in itself.

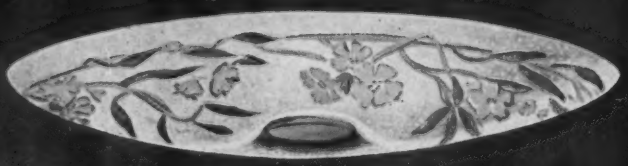
For greater values, guaranteed Lightolier quality, lastingly beautiful designs, specify **Bel Vista.**

7688: 4 LIGHT—40 W. LAMPS.
LENGTH 5½". WIDTH 19". FINISH: PEWTER.

7641: 5 LIGHT—40 W. LAMPS.
LENGTH 4½". WIDTH 21". FINISH: GOLD.

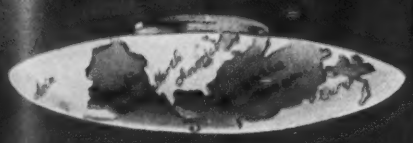


7668: 5 LIGHT—40 W. LAMPS.
LENGTH 4½". WIDTH 17⅞". FINISH: PEWTER.



7619: 5 LIGHT—40 W. LAMPS.
LENGTH 4½". WIDTH 19½". FINISH: GOLD.

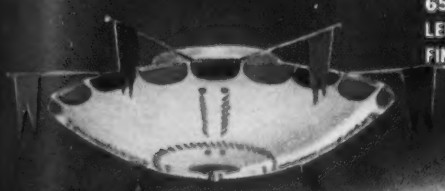
7617: 4 LIGHT—40 W. LAMPS.
LENGTH 36". BODY LENGTH 15".
WIDTH 17⅜". FINISH: SILVER & GOLD.



7615: 3 LIGHT—60 W. LAMPS.
LENGTH 4½". WIDTH 17".
FINISH: SILVIUM.

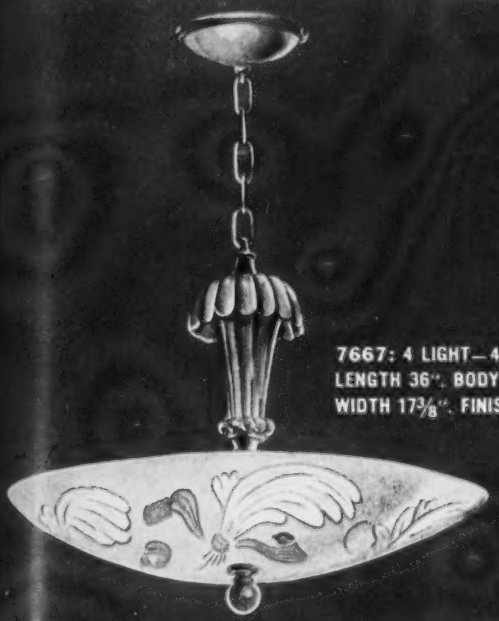
7644: 3 LIGHT—40 W. LAMP
LENGTH 7". WIDTH 13⅜".
FINISH: SILVIUM.

7642: 3 LIGHT—40 W. LAMP
LENGTH 7". WIDTH 14½".
FINISH: SILVIUM.



6589: 3 LIGHT—40 W. LAMPS.
LENGTH 5". WIDTH 17".
FINISH: BLUE & GOLD.

Bel Vista Series by LIGHTOLIER



7667: 4 LIGHT—40 W. LAMPS.
LENGTH 36". BODY LENGTH 15".
WIDTH 17⅜". FINISH: SILVIUM.

DINELIER
7600: 1 LIGHT—150 W. LAMP.
LENGTH 48". BODY LENGTH 15¾".
WIDTH 17⅜". FINISH: GOLD.

Scientifically designed to floodlight the table, illuminate the entire room without glare!

here's what you get in Lightolier merchandise!

Lightoliers are displayed and offered by the outstanding lighting dealers in every locality. Lightoliers are made to rigid quality standards, designed to bring added beauty to the homes they decorate, priced to please exacting customers.

here's what you get in Lightolier's profit plan!

record-smashing
consumer advertising

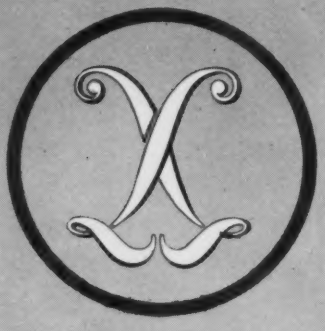
architect-builder-decorator
trade advertising

sales-stimulating
consumer book

business-building
lighting advisory service

pre-tested
display & selling ideas

authorized dealer
Lightolier emblem



A complete selling service that assures you o
rapid turnover, sound profits and the good-wi
of satisfied customers.

here are the new profit-making features in the Lightolier Bel Vista Series

Use this coupon to learn more about what the Lightolier Plan means to you.

Lightolier, Dept. W, Jersey City, N. J.
Please tell me more about

____THE LIGHTOLIER PROFIT PLAN

____LIGHTOLIER BEL VISTA SERIES

Name _____

Firm _____

Address _____

City _____ *Zone* ____ *State* _____

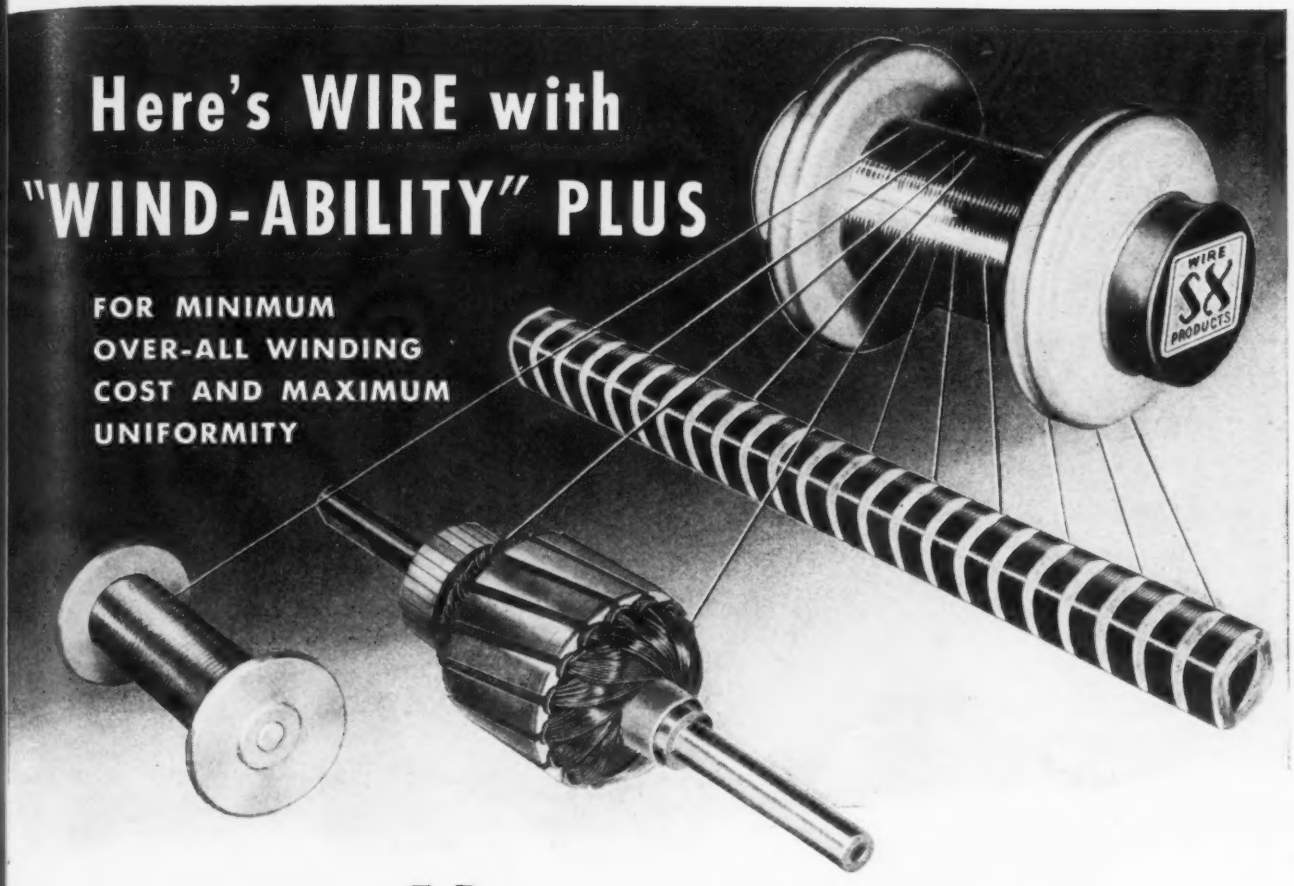
***Overscaled, close-to-ceiling designs...in sizes up to 21½" square...favored by decorators for their smart, built-in look...favored by engineers for efficient, eye-soothing light...favored by everybody for good looks and good value.**

***Dinelier 7600—modern lighting engineering in a gracefully designed dining room fixture that spotlights the table and provides full room illumination.**

*** New glass textures, sparkling, fired-in decorations; simple flowing lines to complement period or modern rooms.**

Here's WIRE with "WIND-ABILITY" PLUS

FOR MINIMUM OVER-ALL WINDING COST AND MAXIMUM UNIFORMITY



HIGH SPEED winding — whether bobbin, random or gang — subjects magnet wire to punishing treatment. Insulating film must be tough, yet pliable. Copper must have the proper degree of anneal. The spool-to-spool uniformity must be right.

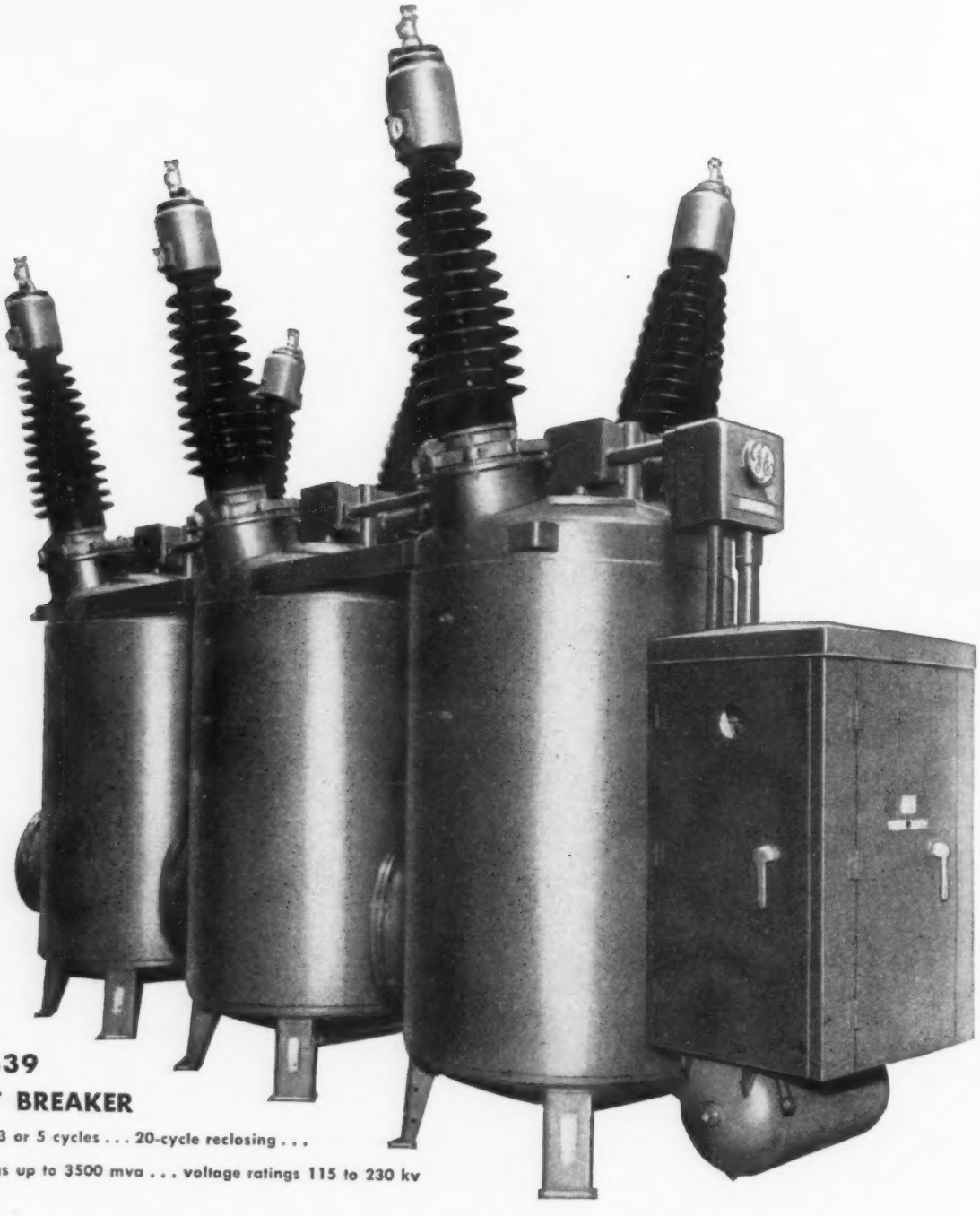
Essex Extra-Test Magnet Wire has earned an unexcelled reputation in the most exacting applications. It helps insure coils of uniform size and resistance value — maximum turns in available space — freedom from broken wires, pile-ups, crossed turns, runbacks, spaced turns, and frequent tension adjustments. When you specify Essex Extra-Test Magnet Wire you can be *sure*.

WIRE SX PRODUCTS

Plants: Fort Wayne, Indiana; Detroit, Michigan; Anaheim, California
Warehouses* and Sales Offices: *Atlanta, Ga.; *Boston, Mass.; *Chicago, Ill.; Cleveland, Ohio; Dallas, Texas; Dayton, Ohio; *Detroit, Michigan; Kansas City, Mo.; *Los Angeles, California; Milwaukee, Wisconsin; *Newark, N. J.; Philadelphia, Pa.; *St. Louis, Mo.; *San Francisco, California.

ESSEX WIRE CORPORATION
FORT WAYNE 6, INDIANA

NOW HIGH-VOLTAGE WITH COMPLETELY



TYPE FK-439
OIL-BLAST BREAKER

Interrupting time 3 or 5 cycles . . . 20-cycle reclosing . . .

Interrupting ratings up to 3500 mva . . . voltage ratings 115 to 230 kv

BREAKERS

SEALED BUSHINGS

FOR REDUCED MAINTENANCE

Twelve-years' experience with over 80,000 moderate-voltage sealed bushings gave General Electric the background for developing these pressure-tight bushings for high voltages. Complete protection against contamination of the internal insulation structure means maintenance costs are reduced.

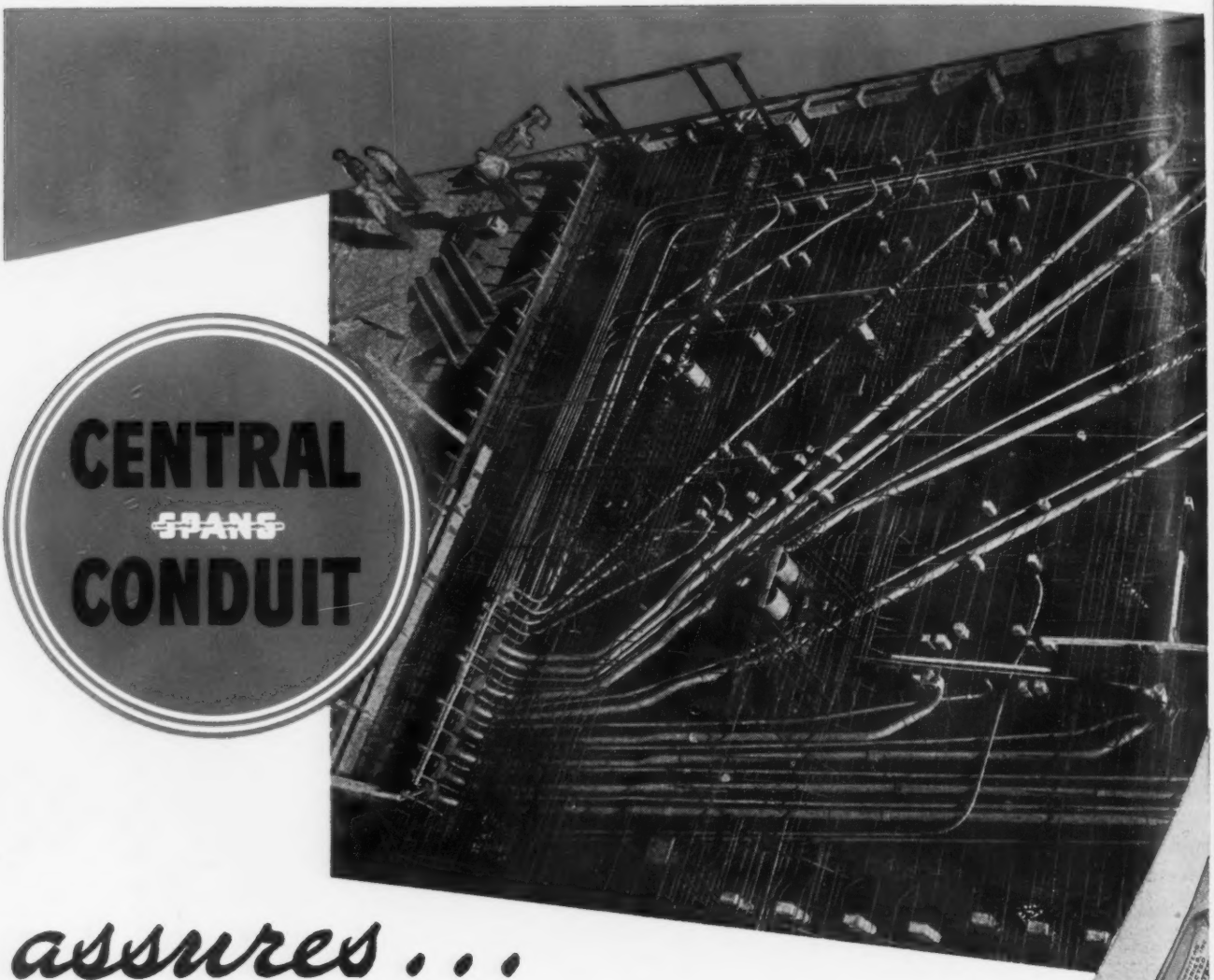
- **The initial high dielectric strength of the liquid and solid insulation is maintained by the completely sealed construction which prevents the entrance of air or moisture. Since the expansion chamber is made of metal, the insulating liquid is not exposed to the deteriorating effects of sunlight.**
- **The initial power factor of the bushing is low, and remains low in service, giving assurance that the bushing is in good condition and free from deterioration.**
- **The magnetic liquid-level gage provides an accurate indication of the oil level in the bushing. Even if the glass enclosing the dial is broken there is no danger from leaks or from moisture entering.**
- **When excess potentials, either 60 cycles or impulse, are applied, the bushing will repeatedly flash over externally rather than puncture or shatter.**
- **Bushings in storage are always ready for immediate installation.**

The FK-439 breaker also has a new lightweight interrupter that assures faster circuit interruption. High-speed reclosing is accomplished by the smooth positive action of the pneumatic mechanism. In addition to facilitating maintenance by increasing the accessibility of operating parts, redesign has also decreased the tank dimensions and over-all unit weight. Call or write your G-E sales representative for bulletin GEA-4407 which tells the complete story of the "439" breaker. *Apparatus Department, General Electric Co., Schenectady 5, N. Y.*

Standard 138-kv
Completely Sealed Bushing

GENERAL ELECTRIC

829-6



CENTRAL ~~SPANG~~ CONDUIT

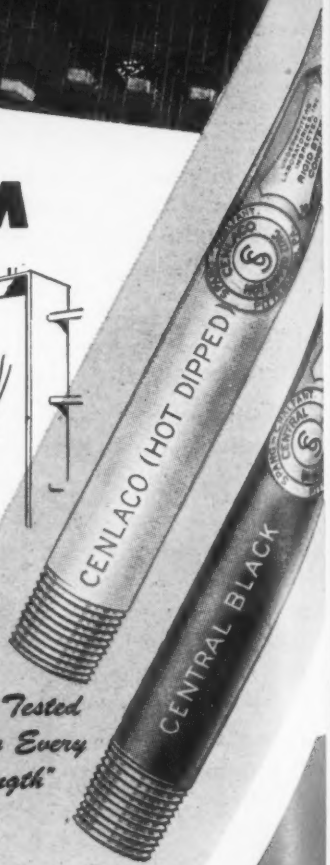
assures . . .

A SAFE WIRING SYSTEM

For a safe wiring system that will resist corrosion and mechanical injury, insist on Central Rigid Steel Conduit.

Central Conduit is made from carefully inspected standard weight Spang CW Pipe. Every length is cleaned in a caustic bath to remove oil, grease or other organic matter. It's rinsed, then pickled in sulphuric acid to remove any scale. The results . . . an absolutely clean outside and inside surface that will assure a tight, lasting bond between the pipe and hot dipped galvanized or black enameled coating. Central Rigid Steel Conduit has threaded and coupled joints—the only kind approved by the National Electrical Code as moisture, vapor and dust tight for use in hazardous locations and occupancies. The results—a wiring system that offers real protection—economy—and dependability.

Shortages and an unprecedented demand has made it impossible at times to supply your Central Rigid Steel Conduit Distributor with all the conduit he needs. But keep in touch with him. He is a dependable source of supply who will make sure your order will be filled just as quickly as possible.



"There's Tested Strength in Every Length"

Pipe selected for Central Rigid Steel Conduit has excellent workability. That's why it's easy to thread, bend or cut right on the job.

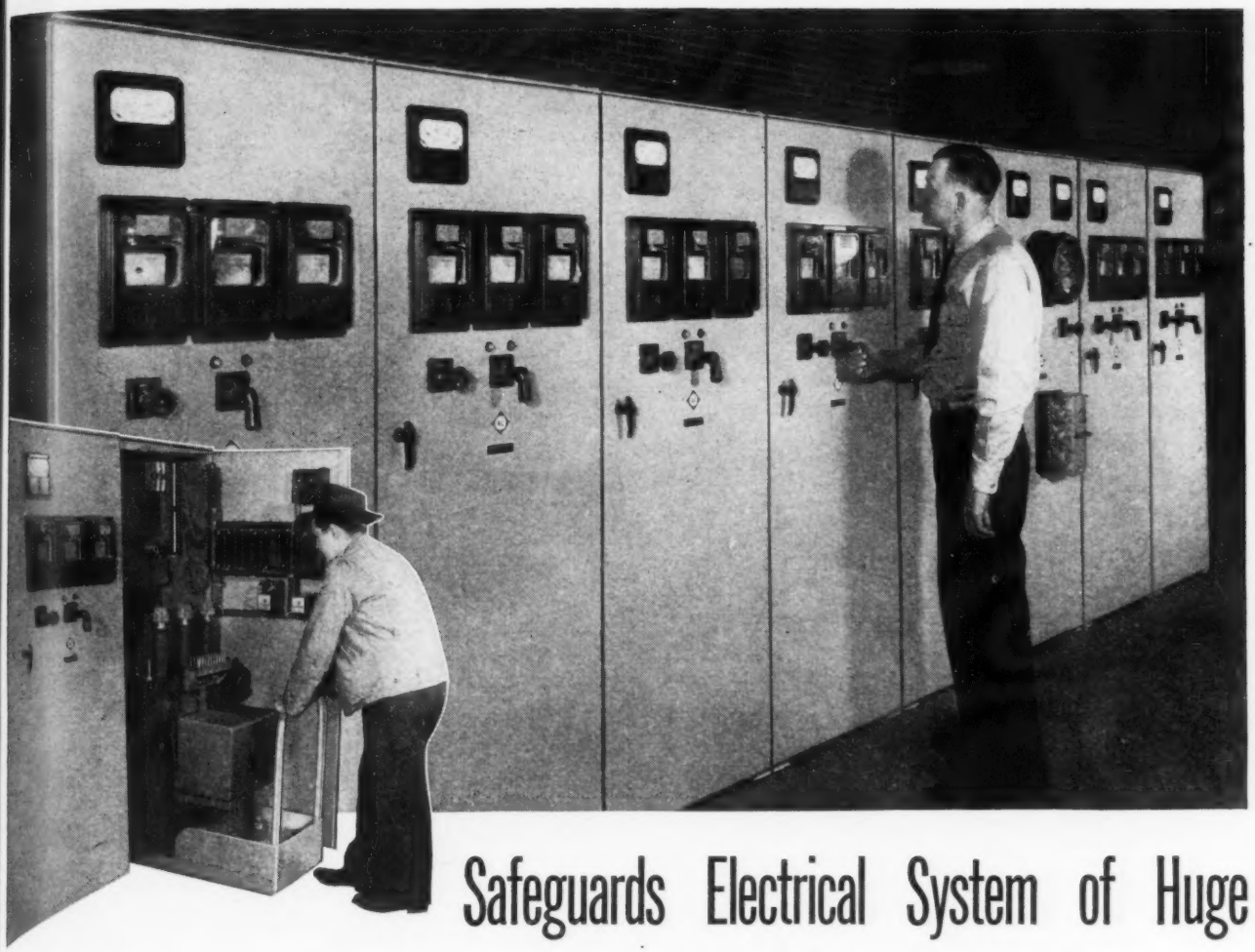
• SPANG-CHALFANT

Division of The National Supply Company

General Sales Offices: Grant Bldg., Pittsburgh 30, Penna.

District Offices and Sales Representatives in Principal Cities

METAL-CLAD SWITCHGEAR ON GUARD!



Unit is easily accessible and removable for visual inspection.

Safeguards Electrical System of Huge Midwest Manufacturing Plant

RELIABLE, POSITIVE protection for this progressive industrial plant is provided by *Ruptair* magnetic air circuit breakers. These units *efficiently* control the output of 6000 kva, 4160 volts, three phase, 60 cycle transformers.

There's safety to operating personnel, too. When the circuit breaker is lowered for inspection, contacts automatically disconnect. Vital buses are completely enclosed in separate compartments. Yes, it's modern *metal-clad* switchgear on which you can depend . . . for fast, sure interruption and permanent, trouble-free duty.

* * *

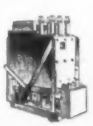
Allis-Chalmers first introduced modern metal-clad switchgear to the U.S. Today, A-C builds a complete line of switchgear for all applications. Bring your problems to experts . . . call your nearest A-C office or write to ALLIS-CHALMERS, MILWAUKEE 1, WIS.

A 2252

Allis-Chalmers Builds all four Types of Circuit Breakers

AIR BLAST available in interrupting capacities from 250,000 kva to 500,000 kva.

MAGNETIC AIR. A-C trademark *Ruptair*. Capacities: 50,000 to 250,000 kva.



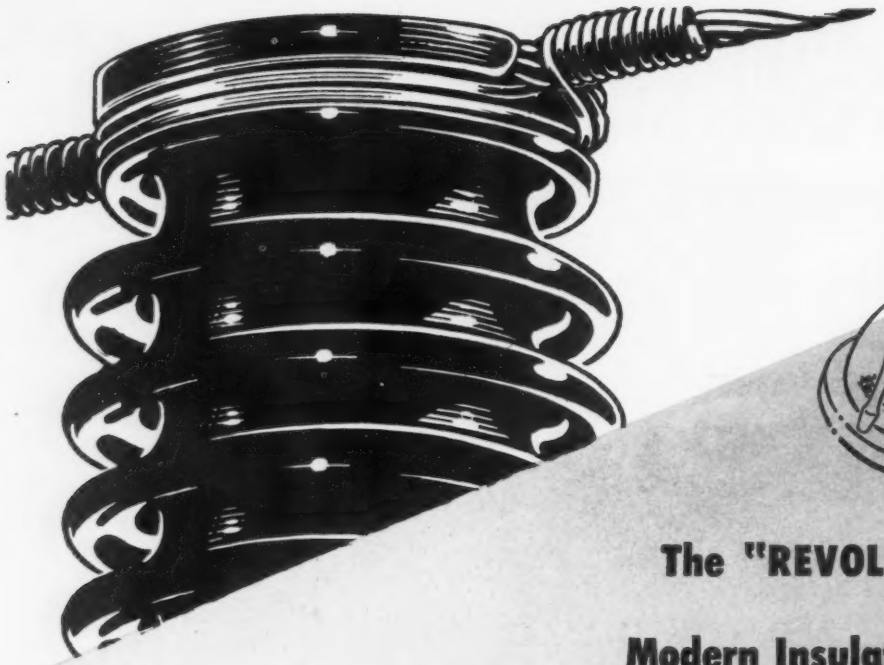
OIL — A-C trademark *Ruptor*. Interrupting. Capacities: 50,000 to 500,000 kva.

LOW VOLTAGE—Metal enclosed dead front; 25,000-50,000 A. I. C., 600 v a-c max

ALLIS-CHALMERS

One of the Big 3 in Electric Power Equipment — Biggest of All in Range of Industrial Products

1847 1947 A CENTURY OF SERVICE to Industry THAT MADE America Great



The "REVOLUTIONARY"

Modern Insulator Design . . .

. . . with a 16 YEAR SERVICE RECORD . . .

LAPP LINE POST

● If the Lapp Line Post still looks like a "new and unproved design" to you—if the operating advantages we claim for it seem too good to be true—consider for a moment: The Line Post is now 16 years old, and it's been delivering those advantages for 16 years. The Line Post has served a tough apprenticeship. Most early installations were desperation moves—insulators put into trouble-spots where conditions were too rough for any conventional insulator. And, so far as we know, its record of successes is unbroken. Under dirt conditions, under lightning flashover, under mechanical attack, and all other operating difficulties, *lines on Lapp Line Posts have fewer insulator outages, have required fewer replacements and less maintenance than comparable lines on any other type of insulator.* Doesn't such an insulator deserve its place in your Transmission Line Standards?

Lapp INSULATOR CO. INC. LEROY, NEW YORK

REELS ARE SCARCE DUE TO SHORTAGES OF LUMBER AND STEEL, *WON'T YOU PLEASE HELP...AND*

Be a "reel" friend

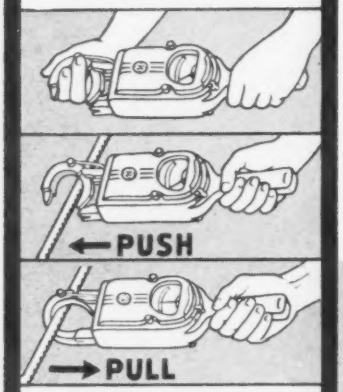
kick-em-back

Each empty reel returned
means $ $ $ to you.
Start 'em rolling today,
freight collect, to

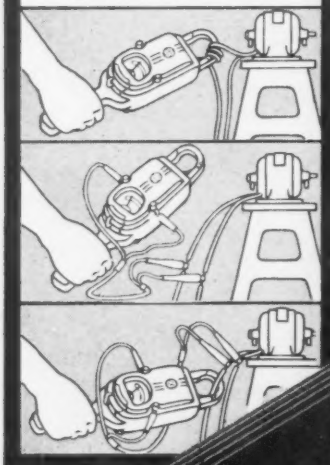
ANACONDA WIRE AND CABLE COMPANY
Care of MILL DESIGNATED ON REEL

HEADQUARTERS FOR ELECTRICAL EQUIPMENT

EASY TO USE
PUSH-PULL OPERATION
TRIGGERLESS SAFETY



VERSATILITY
Can be used for a wide variety of practical measurements



GENERAL ELECTRIC

HOOK-ON VOLT-AMMETER TYPE AK-1

The General Electric hook-on volt-ammeter is a versatile portable instrument for measuring alternating current and voltage quickly and accurately. It's safe, simple, and easy to use for making measurements on the job. Alternating current can be read instantaneously on both insulated and non-insulated conductors by simply hooking the instrument around the line; there's no need to cut conductors or interrupt work — no losses in production or idle labor while measurements are being made. And there's no necessity for separate transformers or additional equipment of any kind.

NEW SMALL COMPACT BATTERY CHARGERS FOR FARM AND HOME USE

These chargers are small and very lightweight. They can be shelf- or wall-mounted or placed on the garage floor, the car floor, etc., and will charge the battery without removal from the car. They are a selenium rectifier-type charger which means they give highly efficient and extremely quiet operation. The "Overnite" charger is especially suitable for farm use to keep car, truck and tractor batteries in top condition. Will charge the average discharged battery in 12 hours or less. The "One Day" charger is ideal for home and general use where the higher charging rate of the "Overnite" is not required. Charges the average normally run-down car battery in 24 hours or less.

"ONE DAY" CHARGER
6RS916A1 battery charger for 6 volts, 3 cells

"OVERNITE" CHARGER
6RS916A2 battery charger for 6 volts, 3 cells

GENERAL ELECTRIC
SUPPLY CORPORATION

SAN FRANCISCO • OAKLAND • SACRAMENTO • FRESNO • LOS ANGELES
SAN DIEGO • PHOENIX • SEATTLE • PORTLAND • TACOMA • SPOKANE

• Electrical wholesalers and salesmen the country over know they can always rely on Raco. They know it's the packaged line, the uniform line, the dependable line—that it's backed by 34 years' experience in the precision fabrication of steel products. Furthermore, Raco products are listed by Underwriter's Laboratories. Write today for information on this *profit* line of switch and outlet boxes. Remember, You Can Always Rely on Raco!

ALL-STEEL EQUIPMENT, INC.
500 Kensington Avenue, Aurora, Illinois

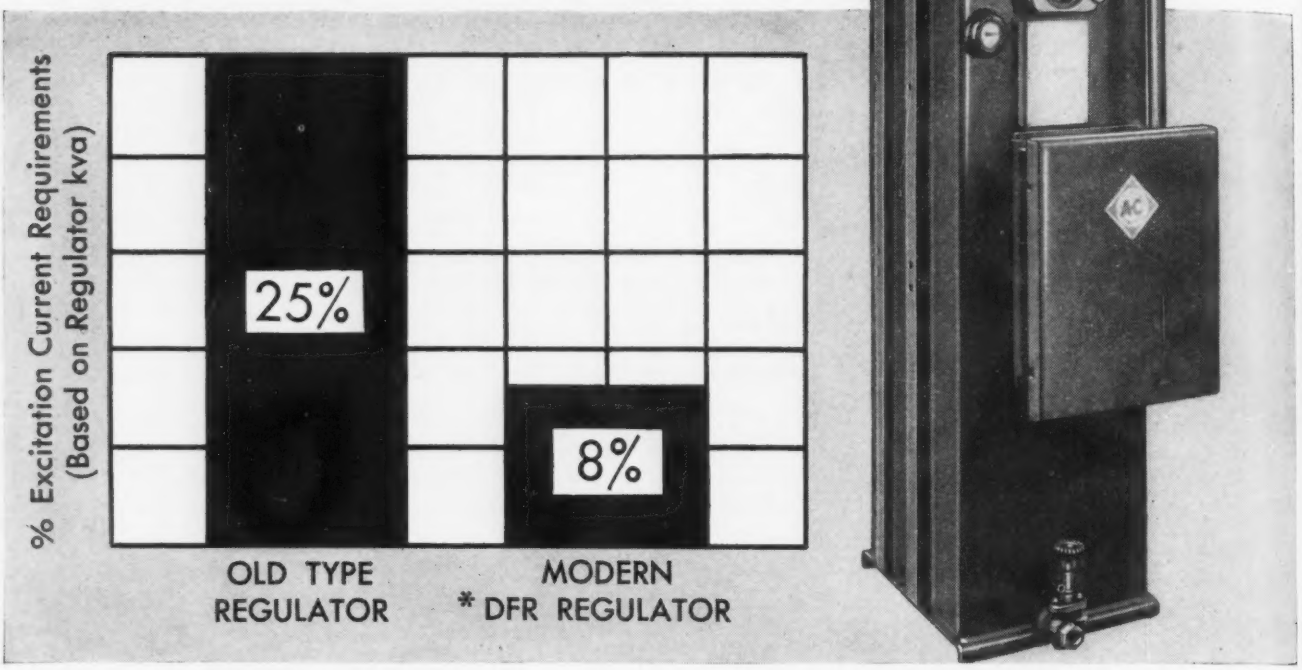
SEND FOR FREE
COMPLETE CATALOG
ON RACO PRODUCTS

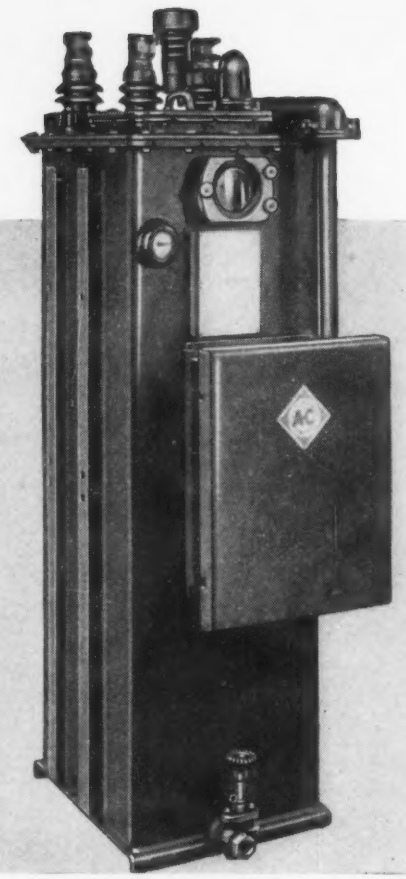
RACO
ALL-STEEL PRODUCTS

A Complete Line of Switch and Outlet Boxes

ALL-STEEL EQUIPMENT, INC.

2/3 OF EXCITATION CURRENT SAVED!





. . . with MODERN Allis-Chalmers *DFR — the Original 5/8% Step Regulator!

HERE'S AN ACTUAL CASE of a large utility. They bought 1,200 old type 100-kva regulators — a total of 120,000 kva installed capacity — before they heard about modern step-regulators.

Each old type regulator required 25% excitation or a total of at least 30,000 kva. *20,400 kva of that wattless current could have been saved by using Modern Allis-Chalmers step-type regulators!* That's because A-C's step regulators require only 8% excitation — a total of just 9,600 kva in this case.

Savings! In this case, a potential $142,800 worth — using DFR step regulators — figured on the basis of $7 per kva for installed capacitors needed to balance 20,400 reactive kva.

And look at equipment cost! This utility figured they were using over $1,000,000 worth of equipment for unnecessary excitation of their old type regulators.

Yes, figure the savings that DFR step-regulators could make on your system!

For further details on how you can save 2/3 excitation current, call your nearby Allis-Chalmers office, or write ALLIS-CHALMERS, MILWAUKEE 1, WIS.

***DFR** — the only station type step regulator you can buy for single phase duty.

1 GET CLOSER REGULATION!

Modern DFR step regulator with its Feather Touch control and voltage integrating relay eliminates holding coils — resulting in closer control.

2 . . . AND LOWER OVER-ALL MAINTENANCE!

Complete oil immersion of all moving parts—even the driving motor—eliminates the need for other lubrication. In addition, because the energy handled by the relay contacts is small, no compounding or holding coils are required. Further, this rugged regulator employs self centering shock absorbing, "quick-break" mechanism and arc resisting long-lived Elkonite RS-1045 contacts.

A 2242

The Only Complete Line of 5/8% Step Regulators

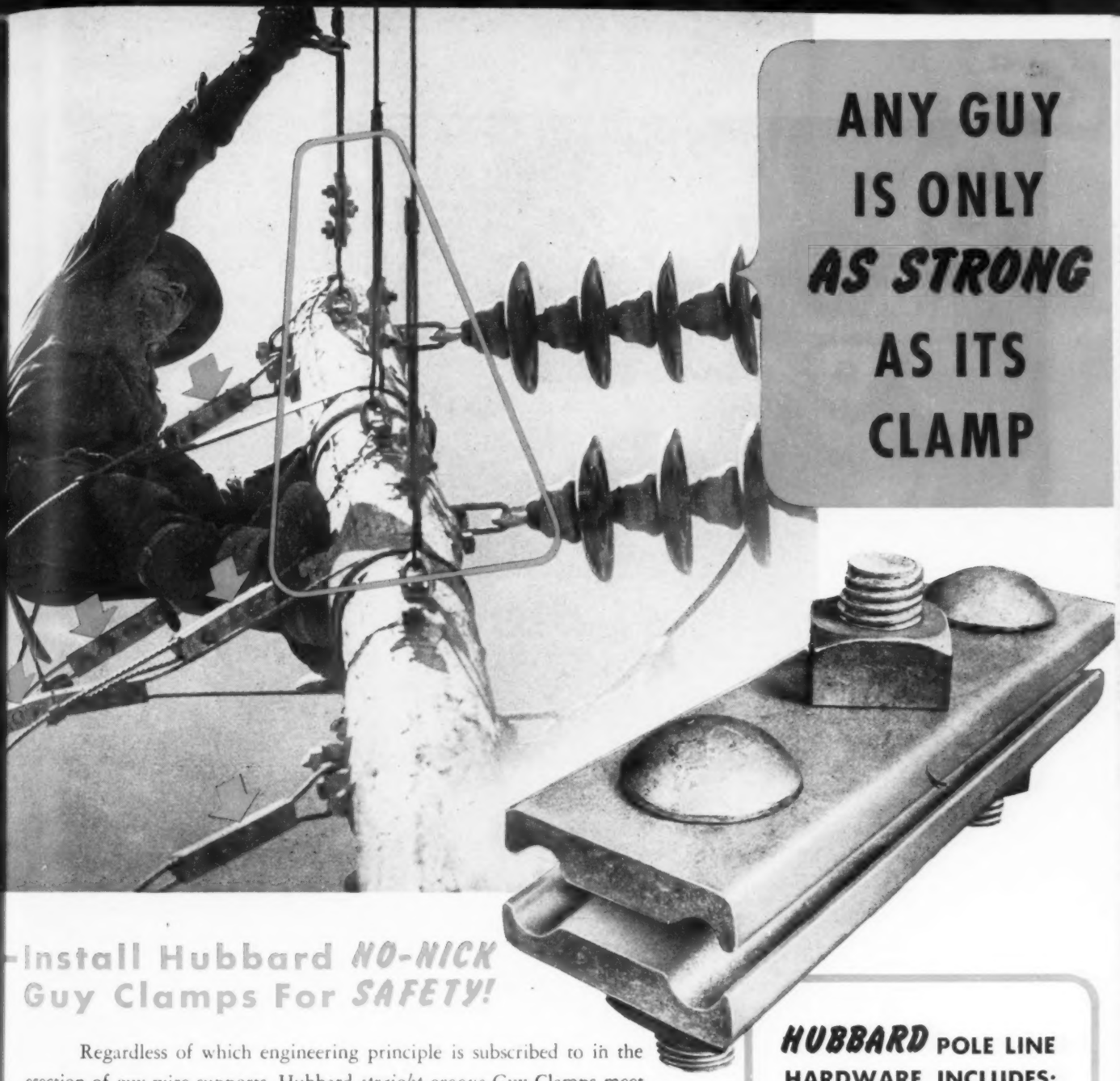
AFR — for 3-phase regulation up to 69 kv, 750 kva.

DFR—for single phase regulation up to 6,900 v, 250 kva.

ALLIS-CHALMERS

One of the Big 3 in Electric Power Equipment — Biggest of All in Range of Industrial Products

1847 1947 A CENTURY OF SERVICE to Industry THAT MADE America Great



ANY GUY IS ONLY *AS STRONG* AS ITS CLAMP

Install Hubbard *NO-NICK* Guy Clamps For *SAFETY!*

Regardless of which engineering principle is subscribed to in the erection of guy wire supports, Hubbard *straight-groove* Guy Clamps meet your exacting needs. Hubbard Guy Clamps can be installed singly or in multiples, depending on anticipated conditions and anchorage requirements. They are designed to permit fractional slippage in relieving critical tension and strain under the impact of excessive or shock loads, or they may be cinched down tight to rigidly snub guy supports. In either case they provide maximum frictional holding surface, and *will not nick, crush or weaken cable strands*. When installing or removing from guys, Hubbard Guy Clamps never need to be dismantled or reassembled. Hot-dip galvanizing affords full protection against corrosion or weathering. *Standardize for Safety* on Hubbard Guy Clamps. Order today or write for complete details.

HUBBARD POLE LINE HARDWARE INCLUDES:

- ★ STANDARD POLE LINE HARDWARE
- ★ CABLE MATERIAL FOR OVERHEAD AND UNDERGROUND CONSTRUCTION
- ★ COMMUNICATION SYSTEM HARDWARE
- ★ ELECTRIC RAILWAY HARDWARE
- ★ STREET LIGHTING EQUIPMENT
- ★ RURAL ELECTRIFICATION MATERIAL

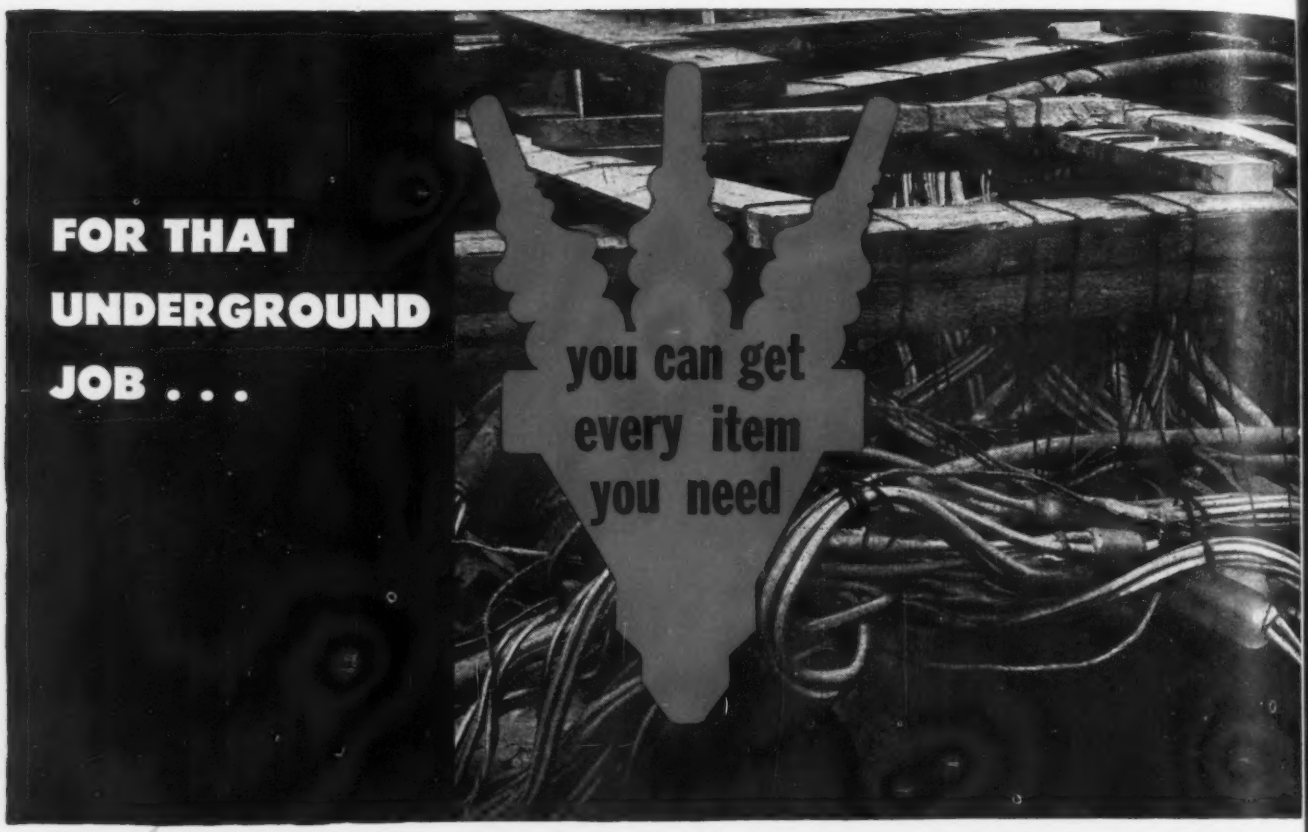
HUBBARD

Hubbard and COMPANY

OAKLAND, CAL. PITTSBURGH CHICAGO

HUBBARD

HANG THE LOAD ON HUBBARD HARDWARE



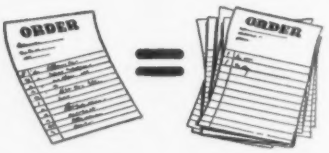
. . . if you plan now with GraybaR

Production of many electrical items has overtaken demand — but there are still some that are hard to get. That's why, if you're planning underground work, you'll be wise to give Graybar a list of your probable supply needs *now*. We'll make sure that the things you want are on the spot where and when you need them, and you'll avoid the risk of unforeseen delays due to slow deliveries.

Graybar distributes *everything for underground construction* — including fibre conduit, manhole fittings, specialized tools and safety equipment, cable, cable splicing materials and carts, potheads and terminals — all first-quality products of leading manufacturers.

Our nation-wide warehousing system enables you to obtain all your underground and pole-line requirements from a single, near-by source. Your local Graybar Representative will gladly help you schedule extension or maintenance projects in keeping with realistic, fast-as-possible supply-delivery schedules. *Graybar Electric Company. Executive Offices: Graybar Building, New York 17, N. Y.*

4747



How Graybar Simplifies Your Electrical Buying

Graybar makes it possible for you to obtain—from a single convenient source—more than 60,000 electrical items, made by over 200 leading manufacturers. Through its 95 offices and warehouses, Graybar shortens the economic distances between 200 makers and 35,000 users. One order, one responsibility, one invoice does the work of many.

Everything for your Pole Lines via GraybaR

IN OVER 90 PRINCIPAL CITIES

POLES • CROSSARMS • STRAND • INSULATORS • HARDWARE • PROTECTIVE DEVICES • LINE TRUCKS • CONNECTORS • TOOLS

"Tops in '26...even better today"

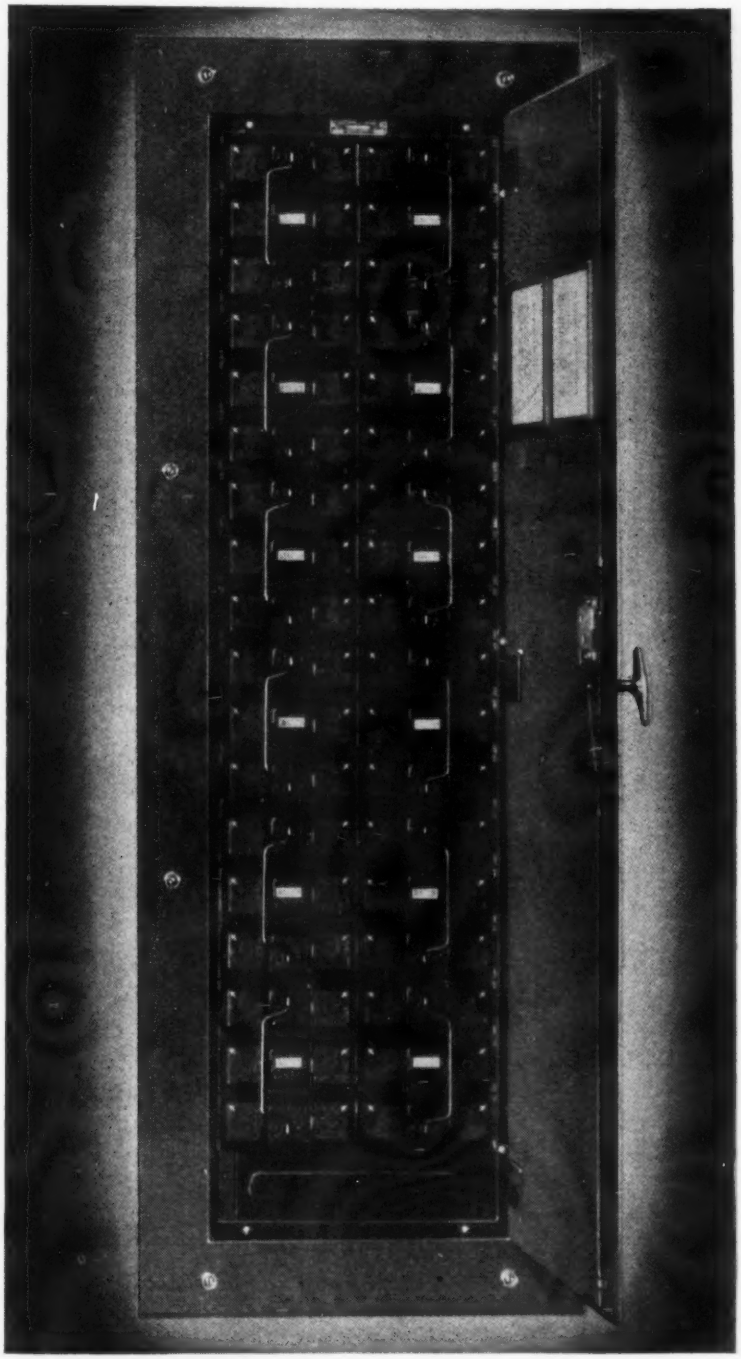
WHEN plant changes or expansions call for new circuits—the electrician knows it will be easy to modify any BullDog SafToFuse Panelboard . . . the flexible panelboard with interchangeable fuse units.

BullDog SafToFuse Panels are compact—primarily intended for those installations where space is at a premium. Because SafToFuse units are standardized, supplemental units can be added, or units of different capacities can be substituted with a minimum of expense and delay.

All current carrying parts and fuses are fully shielded when in service . . . no chance for an accidental contact. If it becomes necessary to replace a fuse or disconnect the circuit, the fuses are removed by pulling out the SafToFuse "head" . . . double protection; also eliminates the need of auxiliary "fuse pullers." Moreover, provisions are made to test fuses—without current disconnection—through holes in the face of the unit.

For maximum flexibility and interchangeability in power distribution, specify BullDog SafToFuse Panelboards . . . tops for twenty years. They'll help you stop your power problems before they start.

A BullDog Field Engineer will appreciate an opportunity to demonstrate the advantages of SafToFuse Panelboards and show you an installation near your own plant. Call him today, or write BullDog direct.



BullDog manufactures Vacu-Break Safety Switches—SafToFuse Panelboards—Superba and Rocker Type Lighting Panels—Switchboards—Circuit Master Breakers—"Lo-X" Feeder BUStribution DUCT—"Plug-in" Type BUStribution DUCT—Universal Trol-E-Duct for flexible lighting—Industrial Trol-E-Duct for portable tools, cranes, hoists.

BULLDOG

ELECTRIC PRODUCTS COMPANY

ADEQUATE WIRING SERVES AND SAVES

DETROIT 32, MICHIGAN. FIELD OFFICES IN ALL PRINCIPAL CITIES. IN CANADA: BULLDOG ELECTRIC PRODUCTS OF CANADA, LTD., TORONTO

CONSULT THE FOLLOWING PACIFIC COAST REPRESENTATIVES:

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Safety Switchboard Company
1445 Stevenson St. Tel. Hemlock 2470
San Francisco, Calif.

Mullenbach Electrical Manufacturing Co.
2300 East 27th Street Tel. Jefferson 2224
Los Angeles, Calif.

FOR Aluminum Armor Rod

THIS NEW CONNECTOR IS EASIER AND QUICKER TO INSTALL

BLACKBURN *Hi-Strength* CONNECTORS

R. E. A. APPROVED

Available for Prompt Delivery!

Check These Features!

1. **SPLIT BOLT TYPE**—No other connector is as simple to install as the split bolt type illustrated above.
2. **TRUE BI-METAL CONSTRUCTION**—The separating washer is copper on one side and aluminum on the other side, and the two metals are bonded together. So the armor rod is completely surrounded by aluminum, and the copper is completely surrounded by copper to prevent electrolysis.
3. **ALUMILITE TREATED NUT**—to prevent seizing of threads. Nut is easily removed.
4. **A HIGH STRENGTH CONNECTOR**—The nut and screw are made of a high strength aluminum alloy, and may be installed tightly over the armor rod to insure a good and lasting connection.

See Your Jobber and Specify These Catalog Numbers:

For ALUMINUM TO COPPER

Line	Tap	Cat. No.
6 Armor Rod	6 Copper	*6 ARC
4 Armor Rod	4 or 6 Copper	*4 ARC

For ALUMINUM TO ALUMINUM

Line	Tap	Cat. No.
6 Armor Rod	6 ACSR	*6 ARA
4 Armor Rod	4 ACSR	*4 ARA

*Type ARC illustrated. Type ARA is all-aluminum construction.

FIRST, MADISON & CLINTON STS. • **JASPER BLACKBURN PRODUCTS CORP.** • ST. LOUIS 6, MISSOURI

BUILDERS OF QUALITY CONNECTORS FOR OVER 10 YEARS

PROTECTION...

at the VITAL POINT!

When lightning crackles near your installation be sure you are protected at the vital point! Any protective device best serves its purpose when it is *as near as possible to the equipment to be protected.* Southern States' Repeating Expulsion Gaps are so designed that they can be applied directly on the equipment, as shown in the above illustration.

When excessive voltage, such as a lightning induced surge, spills across the rod gap, the high speed fuse link provides a metallic path directly to ground, completely discharging the surge and interrupting the follow-up current by expulsive action in the first one half cycle. The tube then drops to the operated position, and a reserve tube automatically swings into operating position, providing protection against any subsequent surge.

Eliminate guesswork! You can assure yourself that protection is provided by visual inspection. A tube will not stay in the operating position unless the link is intact, and when the link is intact it definitely provides a metallic circuit to ground from the rod gap.

Write TODAY for Information Bulletin. Address your inquiry to Box 473.

Southern States Equipment Corp.

HOME OFFICE AND FACTORY — HAMPTON, GEORGIA

REPRESENTATIVES IN FOLLOWING CITIES:

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MEMPHIS, TENNESSEE
DALLAS, TEXAS
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LUBBOCK, TEXAS
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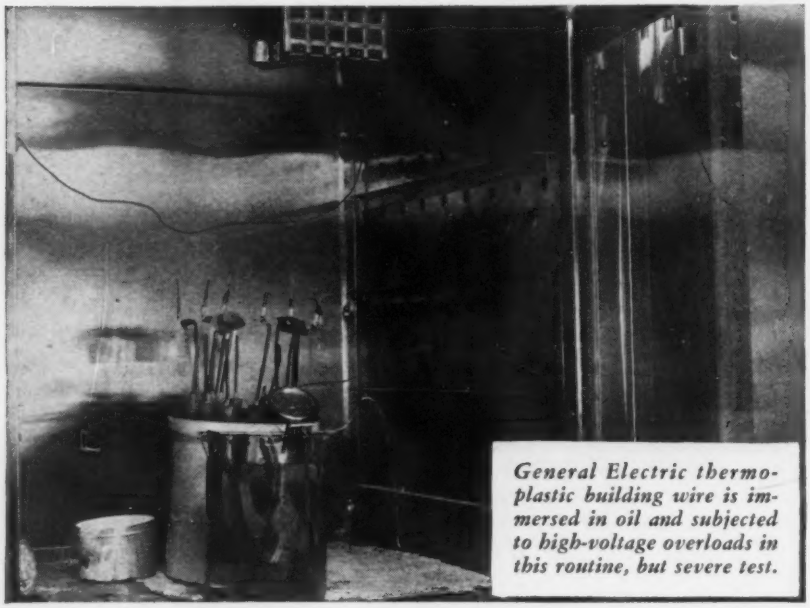
STANDS UP TO OIL *unnaturally*



General Electric thermoplastic building wire is immersed in oil and subjected to high-voltage overloads in this routine, but severe test.

Sooner or later, oil penetrates and softens most insulations of natural organic origin. But General Electric's thermoplastic building wire has the *un*natural ability to resist oil year after year with no weakening in its outer line of defense. Chemically, it simply *ignores* the oil, even when coated with it, or submerged in it.

Users of General Electric Types T and TW no longer fear the conditions that may subject building wire to oil in installation or service . . . greasy hands, leaking pipes, running wires to process equipment. And they're equally unconcerned about moisture and most chemical fumes or vapors.

What's more, this *un*naturally long-lived insulation saves time for the installer, too. It pulls easily, strips cleanly, and is highly abrasion-resistant. No wonder it has been accepted so rapidly as a permanent advance!

Thermoplastic
First . . . and foremost
Type T Building Wire

Because General Electric pioneered thermoplastic, you get the benefit of extra years of improvement when you add "G.E." to your specifications for Types T and TW building wires. To learn about their long-term savings, write to Section W55-625, Appliance and Merchandise Department, General Electric Company, Bridgeport 2, Conn.

*Trade-Mark Reg. U. S. Pat. Off.

GENERAL ELECTRIC

AROUND THE CIRCUIT with your Merchandise Distributor

ANOTHER THERMOPLASTIC-INSULATED WIRE that has excellent electrical and

physical characteristics is General Electric *fixture wire,* Types TF & TFF. Use them in wiring lighting fixtures when you want small diameter, single-conductor wires that are easy to handle in every way. They can be identified easily by the bright, permanent color coding.

NOT ONE — BUT THREE TYPES of Flamenol* portable cords are made by General Electric for use on portable tools and appliances, ranging from electric fans to powerful grinding machines. Select heavy-duty, medium-duty, or rip-cord to fit your needs. All are available in a variety of sizes and strandings.

THIS OLD MAN IS SPRYER THAN EVER after fifty years of useful service. We're talking about good old BX* armored cable, which is fifty years old this year. A product has to be good to stick that long — one of the reasons that so many General Electric products today are still being sold after many years on the market.

YOU'VE GOT TO PUT POWER IN TO GET POWER OUT — so don't forget General Electric's service entrance and service drop cables and fittings in planning industrial or residential wiring. They are backed by the electrical and manufacturing experience of the leading name in wires and cables.

SAVE TIME on Construction Jobs

Specify CHANCE Tools

and get these extra features:

1. Installing bar, tamp and anchor retriever combined in one tool.

2. Safe, reversible point pike pole with reinforced butt — wire lift attachment.

3. Maul with seasoned hickory inserts to prevent damage when driving anchor rods.

4. Trip auger—bores like a bit, telescoping rod from 5 to 8 feet, adjustable reamer for various hole sizes, easy dump trip.

5. Anchor expanding and tamping bar. Hooks around rod to prevent slipping off anchor top plate.

6. Transformer gin with new light weight aluminum fitted chain tightener. Easy to apply. Has safety lock.

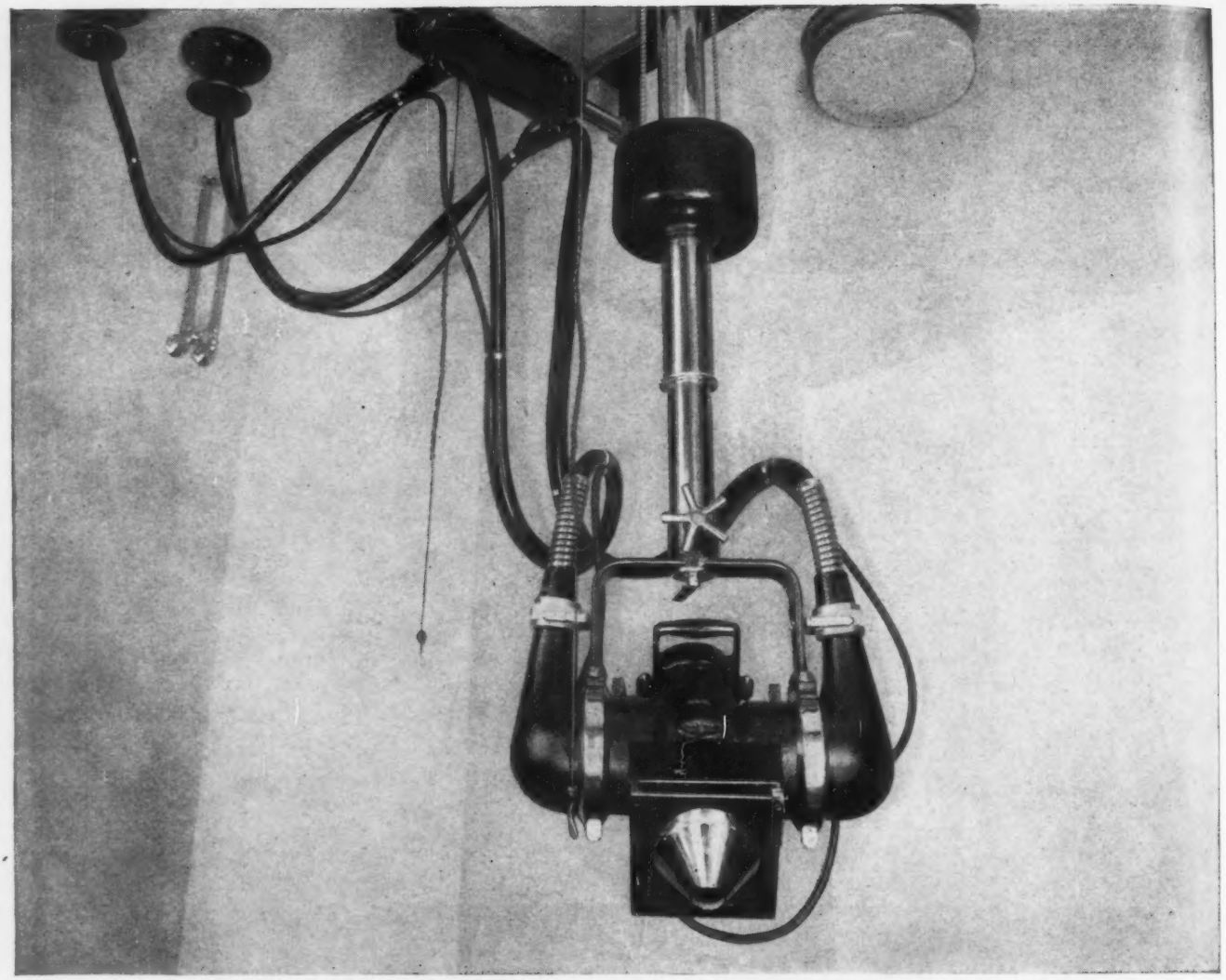
7. Tugger pulls or lifts in any position. Link type chain prevents binding or kinking. Light weight diecast aluminum alloy handle, housing and cover.

Write for Complete Information Today

ABC INDUSTRIES

A·B·CHANCE CO·

CENTRALIA, MO. • SAN FRANCISCO, CALIF.



Kerite insulation withstands the dielectric stress and constant flexing of commercial x-ray use.

The Cable Nobody Could Build

CABLE insulation takes a beating in commercial x-ray service. It is subjected to constant flexing at short radius, under high voltage stress, and over a wide temperature range. For years, x-ray cable failures were common occurrences until the problem was given to the engineers of the Kerite Company.

The answer was found with the first lengths of Kerite x-ray cable manufactured. Today Kerite cable is standard equipment on many x-ray machines.

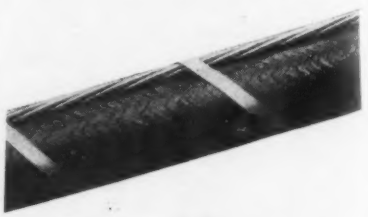
Perhaps *your* cable problem can be solved by Kerite-insulated cable. It costs nothing to find out. Kerite-insulated wire and cable is made for a wide variety of power and signal-system applications. Ask any Kerite user about its remarkable stamina and low cost per year. *The Kerite Company, 30 Church Street, New York 7, N. Y.*

Offices also at: 122 S. Michigan Ave., Chicago 3; 582 Market St., San Francisco 4; 714 W. Olympic Blvd., Los Angeles 15.

Kerite Insulation—Your Cable's Best Life Insurance

KERITE CABLE

Kerite Aerial Cable



Kerite factory-assembled aerial cable saves installation time, eliminates tree trimming, stands up under severe ice conditions.

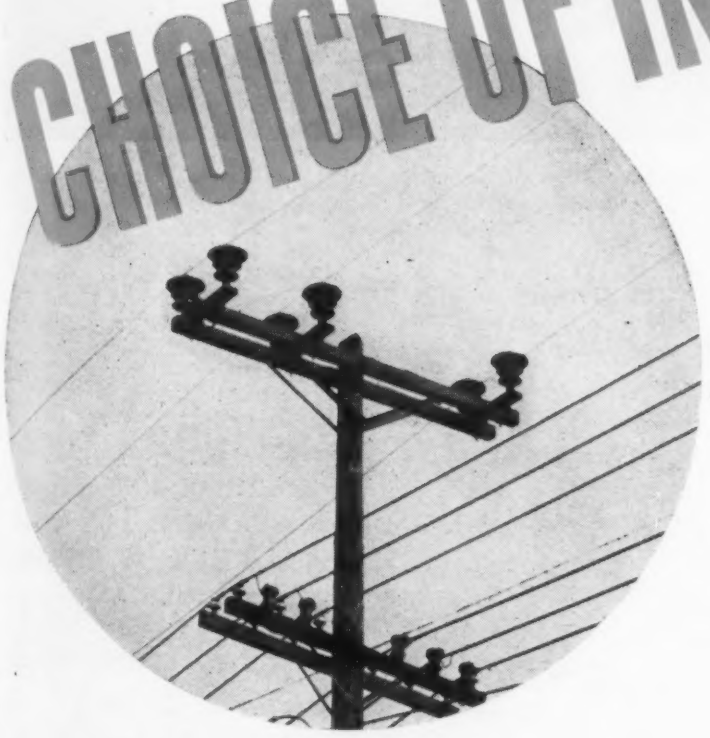
Pacific Coast Representatives: *Carlo Baldassari, 582 Market St., San Francisco 4*
Robert A. Young & Co., 714 Olympic Blvd., Los Angeles 15

A GOOD REASON WHY

THIS POWER COMPANY'S

CHOICE OF INSULATORS

REMAINS O-B



IN 1916, these O-B pintypes were purchased for a transmission line, which was abandoned in 1927, and the insulators put up on three distribution circuits. For 31 years in two different locations these O-B pintypes have given completely trouble-free performance with the end not yet in sight... It's easy to see why owners of these lines continue to choose O-B for their insulation requirements--for the same reason that O-B should be *your* CHOICE OF INSULATORS!

Ohio Brass

2774-H

MANSFIELD, OHIO

CANADIAN OHIO BRASS COMPANY, LIMITED
NIAGARA FALLS, ONTARIO

HEADQUARTERS FOR PORCELAIN INSULATION

A magnified cross-section of an individual wire in bethanized strand would look like this. Note how the steel base wire (inner circle) is surrounded by the uniform bethanized coating of rust-resisting zinc.

BETHANIZED STRAND

The uniformity of our strand is something we like to talk about. When you buy bethanized strand of a certain type and construction . . . then duplicate your order next week or next month . . . you're going to find the same high quality in both lots. The same easy handling characteristics. The same high standard of workmanship.

And the coating will be uniform, too. For bethanized strand has an armor of pure zinc, applied electrolytically. No thin spots here and thick spots there. Coating is of *uniform* thickness over the surface of each individual wire. That means *uniform* protection.

Remember, also, that the bethanized coating is available in A-, B- and C-weights to meet different corrosive conditions. Regardless of the weight of the coating, you'll find it so ductile that it will virtually eliminate flaking, peeling and checking.

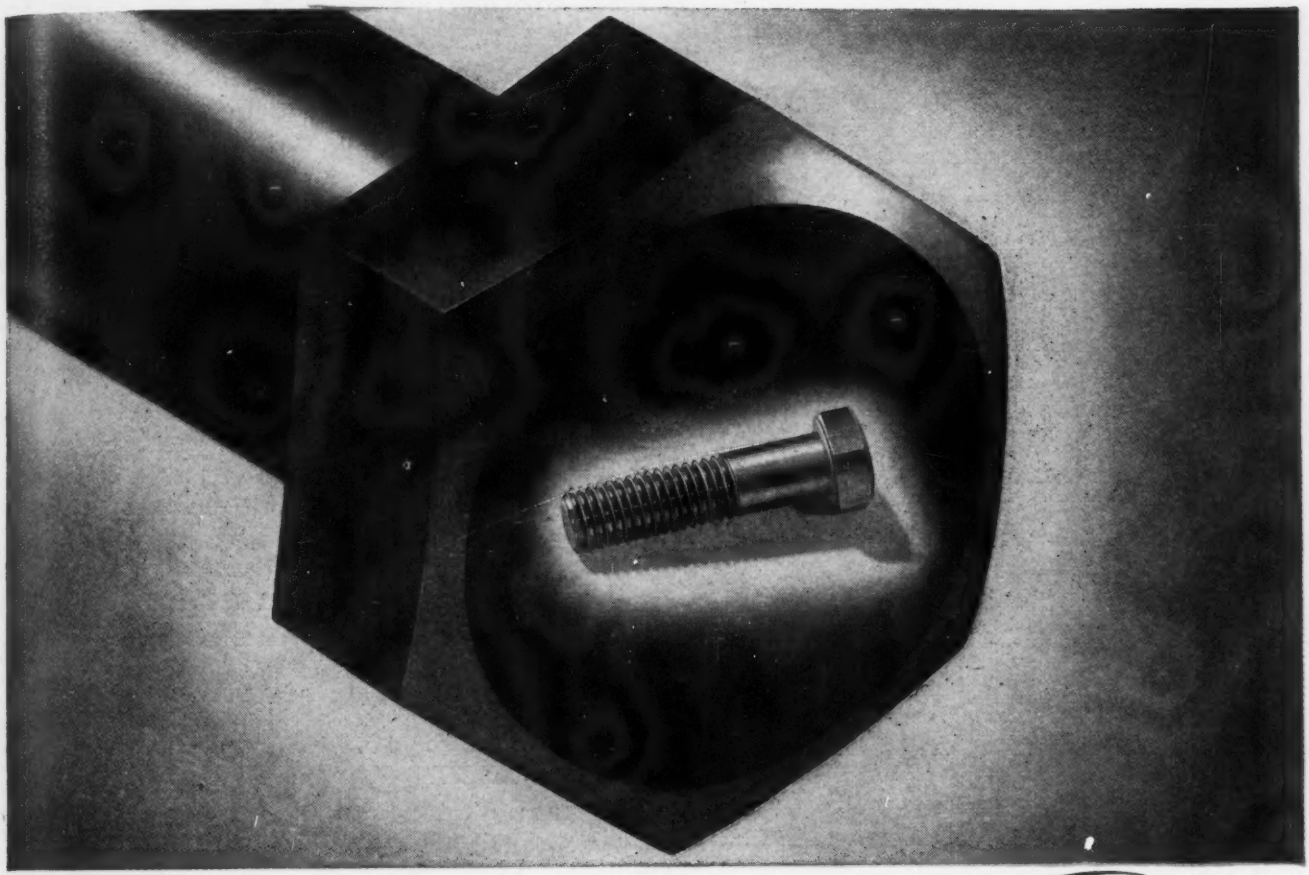
Full details on bethanized strand are readily available at the nearest Bethlehem Pacific sales office.

BETHLEHEM PACIFIC COAST STEEL CORPORATION

Sales Offices: San Francisco, Los Angeles, Seattle, Portland, Salt Lake City, Honolulu

★ BETHLEHEM STEEL ★

BETHLEHEM PACIFIC



WHEN YOU GET MAXIMUM HOLDING POWER PER DOLLAR OF INITIAL COST . . THAT'S **t.f.e.** True Fastener Economy!

It's the cost of *using* a fastener that counts. Wherever maximum fastener strength is required . . . such as for engines and machine tools . . . it is *T*rue *F*astener *E*conomy to specify high-quality Cap Screws.

R B & W *Cap Screws for Utmost Security*

Raw material that is subjected to the most rigid mechanical and physical examination . . . cold-forming on the most modern machinery . . . continuous inspection at every stage of manufacture . . . contribute to your assurance that RB & W Cap Screws will have uniformly high physical properties and a finish that enhances the appearance of the finished product.

Such facilities as spheroidizing furnaces, close control heat treating, finest heading and threading equipment enable R B & W to manufacture its products to meet the severe stress conditions and close tolerances required of highest quality Cap Screws.

You Get T. F. E. When You

1. Reduce assembly time to a minimum by savings through use of accurate and uniform fasteners
2. Make your men happier by giving them fasteners that make their work easier
3. Reduce need for thorough plant inspection, due to confidence in supplier's quality control
4. Reduce the number and size of fasteners by proper design
5. Purchase maximum holding power per dollar of initial cost, by specifying correct type and size of fasteners
6. Simplify inventories by standardizing on fewer types and sizes of fasteners
7. Save purchasing time by buying larger quantities from one supplier's complete line
8. Contribute to sales value of final product by using fasteners with a reputation for dependability and finish

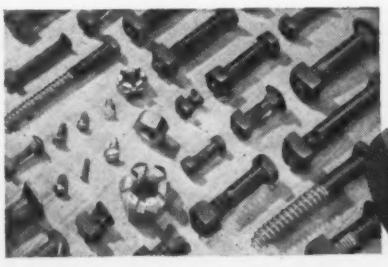
RUSSELL, BURDSALL & WARD BOLT AND NUT COMPANY

102 years making strong the things that make America strong

RB&W bolts, nuts, screws, rivets and allied fastening products are manufactured in a broad range of styles, sizes and finishes.

• • •

Plants at: Port Chester, N. Y., Coraopolis, Pa., Rock Falls, Ill., Los Angeles, Calif. Additional sales offices at: Philadelphia, Detroit, Chicago, Chattanooga, Portland, Seattle. Distributors from coast to coast. By ordering through your distributor, you can get prompt service from his stocks for your normal needs. Also—the industry's most complete, easiest-to-use catalog.

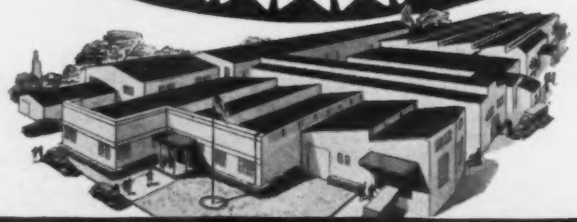


NATUR-LITE
FLUORESCENT

Clues to Quality!

The two labels of certification—Fleur-O-Lier and Smoot-Holman—tell the whole story of quality. Behind these labels are certified ballast, certified starters, certified reflection factors... as well as sturdy, dependable construction. It pays to buy Smoot-Holman quality and performance, neither have been sacrificed for price appeal.

SMOOT-HOLMAN COMPANY
SMOOT-HOLMAN
INGLEWOOD, CALIFORNIA
MADE IN U.S.A.



Offices in Principal Western Cities—Branch and Warehouse in San Francisco

ELECTRICAL BOOKS

PANEL HEATING AND COOLING ANALYSIS, by B. F. Raber and F. W. Hutchinson, 208 pp., 8½x5½, illustrated, John Wiley & Sons, $3.50.

The authors, professors of mechanical engineering at the University of California and Purdue University, respectively, present an intensive analysis of panel heating, applicable whatever the method of getting the panel warm. The book cannot be described as simple, but the effort will reward electrical men who are concerned with space heating.

The effort need not, however, be extreme, for the book has been separated into three sections. The first is non-technical and descriptive, the second is a rigorous mathematical treatment of the mechanisms of radiant heat exchange, and the third is a presentation of simplified mathematical treatments with discussions of the degree of simplification involved in each case.

Even on a casual consultation with this book, the reader concerned with heating will learn the difference between true and so-called radiant heating, the relation of room size to radiant temperatures, where radiant panels should be located, and many other equally fundamental considerations.

INDUSTRIAL ELECTRONIC CIRCUITS, by Walther Richter, 569 pp., 6x9, index, illustrated, McGraw-Hill, $4.50.

Based on ten years' university extensions instruction to classes mostly unacquainted with calculus, the author has developed a book, principally for use as a text in similar classes, which treats industrial electronics with a minimum of math. The book nevertheless dwells heavily on fundamental principles, in many cases repeating principles in several variations for emphasis. Electrical engineers may also find use for such a book in briefing themselves on vacuum tube developments without the necessity of undertaking a rigorous study of the subject. The book is intended also to bridge the gap to more elaborate works on electronics.

SERVOMECHANISM FUNDAMENTALS, by Henri Lauer, Robert Lesnick and Leslie E. Matson, 277 pp., 6x9, illustrated, McGraw-Hill, $3.50.

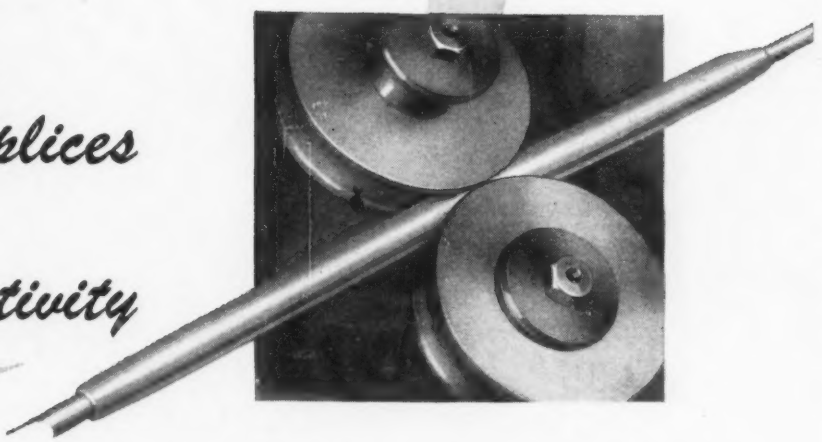
This is a thorough book, intended for both the engineering student and practicing engineer who wish to master the underlying principles and operating characteristics, with emphasis on transient analysis. Assembled here is a wide collection of wartime experiences from a variety of sources; the authors are all of the engineering department of RCA.

PHOTOELECTRIC CELLS., by A. Sommer, Ph.D., 104 pp., 8½x5½, illustrated, Chemical Publishing Co., $2.75.

A treatment of photoelectric cells of the emission type, excluding barrier-layer and photo-conducting cells. It takes up the emission principle, describes manufacture and the properties of photocathodes, discusses gas-filled and multiplier photocells, then deals with the strictly photoelectric aspects of cell applications.

Powerful Rolling Pressure of Kearney Splicing Machine

Assures Permanent Splices with High Conductivity

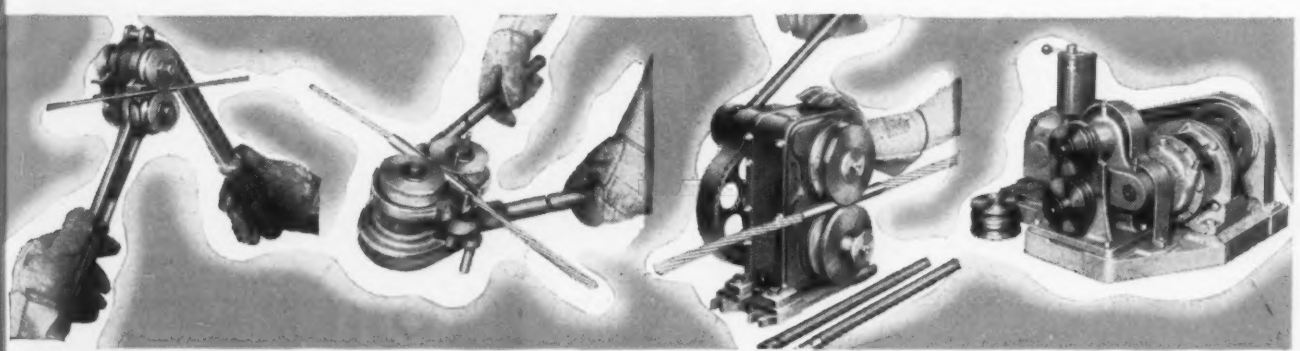


TREMENDOUS pressure developed between the rolls of Kearney Splicing Machine compresses Kearney Sleeves with such force that the splice is stronger than the conductor. Rolls of these machines are permanently set at the factory—They never need adjustments, gauges are not necessary.

To provide maximum gripping action between the conductor and the inner wall of the sleeve, Kearney Splicing Sleeves are furnished in 3 types. Each type produces the best splices on the material for which it is designed.

Small copper sleeves are bonded tightly to the conductor by the use of an abrasive compound on the inner wall. Large copper sleeves contain a coiled wire that is forced into the conductor and the sleeve wall. Aluminum sleeves are made with a threaded inner wall which produces a gripping action when compressed.

For Most Efficient Joints, Use Kearney Splicing Machines To Install Splicing Sleeves.



No. 6-3 splices sleeves from 3/16" to 9/16".

No. 7-2 splices sleeves from 3/16" to ⅝"—larger and sturdier than 6-2 machine.

No. 8-2 splices sleeves from ¼" to 1⅛"—suitable for field or shop use.

No. 9 power operated splicing machine is ideally suited to store room salvage use—¼" to 1⅛" sleeves.

90

For Better Results

Specify Kearney Products

MAYDWELL & HARTZELL
INCORPORATED
LOS ANGELES • SAN FRANCISCO PORTLAND

YES—
BRONCO 60
has DU PONT
NEOPRENE
JACKET

Here's wire and cable that will provide even longer life—Bronco 60 with du Pont Neoprene Jacket. Neoprene is vulcanized onto Bronco 60 wire and cable by our own exclusive process. That means it is flame resisting; impervious to acid, alkali, moisture and oil, and highly resistant to sunlight cracking, crushing, wear and tear.

Always Specify BRONCO

Send for new, Complete Catalog

WESTERN
INSULATED WIRE CO.
1001 East Sixty-Second St.
Los Angeles 1, California

PRODUCT NEWS

Hot-Line Clamp (600)

The new Matthews hot-line clamp has a self-lubricating lock nut, designed to prevent loosening under vibration and to eliminate corroded or "frozen" eye bolt threads. Positive contact at all times and easy removal, even after years of service, is assured, according to the company announcement. These clamps can be installed or removed with any standard hook or socket type hot stick. Duck bill of hook facilitates guiding of clamp on main line wire. Available in the following types: all-purpose clamp (cast bronze plated) for connection of wires of like or unlike metals; cast aluminum clamp for aluminum to aluminum or aluminum to copper connections; cast bronze clamp for connections of copper to copper.

Strain Clamp (601)

Brewer-Titchener's new No. 2116 clamp completes its line of pressed-steel snubbing type strain clamps for rural, distribution and light-duty transmission lines. It is designed for all conductors within its size range, 0.160 to 0.550 in.; armor tape recommended for use on A.C.S.R. reduces the maximum cable size accommodation. The one-piece body is pressed from chrome-nickle-copper-manganese alloy steel. This light-weight clamp has reversible, double-wave clamping keepers; short connecting length; smooth die-formed cable seat, long clamping section; large snubbing radii; come-along loop for field application.

"Sir, you are speaking of the industry I love!"

Here's the challenge one utility executive directs at fluorescent lighting fixtures:

"I wish the manufacturers of fluorescent fixtures would cut out the claims and counter-claims and get down to business with some facts and useful information. I wish they'd be frank with us." Those sound like "fightin' words" but CERTIFIED FLEUR-O-LIERS provide a ready short-cut for wholesalers, contractors, utilities AND users.

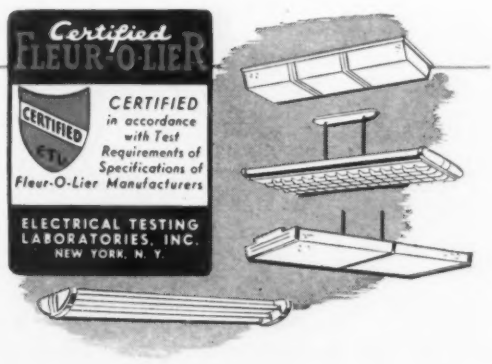
And here's the quick answer that simplifies the problem:

CERTIFIED FLEUR-O-LIERS are made by 27 leading manufacturers. Although each manufacturer creates his own styling and design, basically the CERTIFIED FLEUR-O-LIER fixtures are made to *exacting specifications* for electrical and mechanical excellence . . . plus good lighting performance. They are tested, checked and CERTIFIED by famous Electrical Testing Laboratories, Inc., as meeting all specifications. That's why the CERTIFIED FLEUR-O-LIER Label on a fixture is all you need to assure you—without exaggeration—of top quality in fixtures.

FLEUR·O·LIER

Manufacturers

Fleur-O-Lier is not the name of an individual manufacturer, but a group of 27 leading fixture manufacturers. Participation in the FLEUR-O-LIER MANUFACTURERS' program is open to any manufacturer who complies with FLEUR-O-LIER requirements.



A paper insulated power cable may seem to consist of nothing more than a copper conductor covered with a few layers of oil impregnated paper and protected from moisture by a lead sheath. It is easy to be misled by what appears to be a simple combination of a few basic materials.

You do not see:

- The careful selection and testing of the paper.
- The purification and inspection of the impregnating oil.
- The thorough drying of the cable under very high vacuum.
- The numerous precautions to insure a lead sheath of uniform quality and thickness.
- The various tests that watch quality step by step during the manufacturing processes.
- The searching electrical tests that assure us and tell you that the completed cable is up to the high Simplex standards, which are way beyond those set by the most rigid commercial specifications.

It is these unseen features that give you the cable from which you can expect the service you need. They should not be overlooked. In the making of Simplex Paper Insulated Power Cables, these unseen but important features receive unusual attention. That is why you should talk with Simplex engineers before you buy Paper Insulated Power Cable.

Simplex-WIRES & CABLES

SIMPLEX WIRE & CABLE CO. 79 SIDNEY ST. CAMBRIDGE 39, MASS.

Transformer Gin (602)

A transformer gin, designed for raising transformers, oil circuit breakers and other pieces of equipment for body-of-pole installation has been announced by the James R. Kearney Corp. Rated at 1,500 lb. maximum load, it will handle any standard 25-kva. rural line transformer or distribution transformer. The mast is made of hardwood with high dielectric strength; fittings are galvanized steel with spur-like projections which sink in the pole. The chain is attached at the middle of the mast so as to prevent rocking and is tensile tested above working stress. The complete gin is 24 in. over-all and weighs 15 lb.

Pole Hole Diggers (603)

Continental Farm Machine Co. is marketing pole hole diggers for power line work. The machines can be mounted on a truck, tractor or jeep and will operate from the driver's seat. Auger diameters vary from 4 to 14 in., with depth adjustable from 44 to 72 in. The company estimates that, under normal conditions, one man using this device can dig 140 to 150 holes a day.

Bind Post (604)

The new Superior Electric Co. binding post, Type DF30, offers five ways of connecting leads: permanent clamping of wire up to size No. 12 through the center hole; looping of wire around the center shaft and clamping; plug-in connection of a standard ¾-in. center banana plug; clip-lead connection by removing the hexagonal shaped phenolic head; spade lug connection. Current-carrying capacity is 30 amp. Metallic parts are recessed for a dead front. Post comes ready for mounting on any panel up to ¼ in. thick.

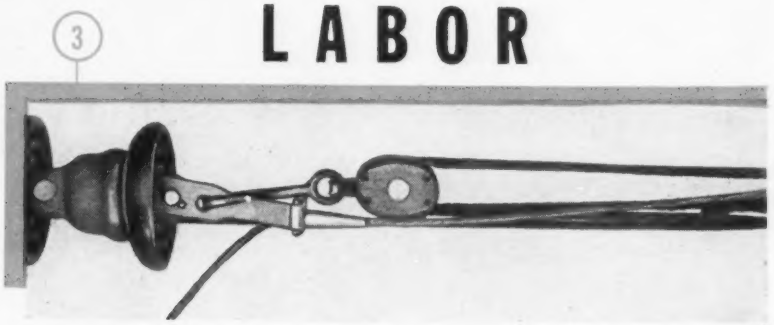
Insulation Tester (605)

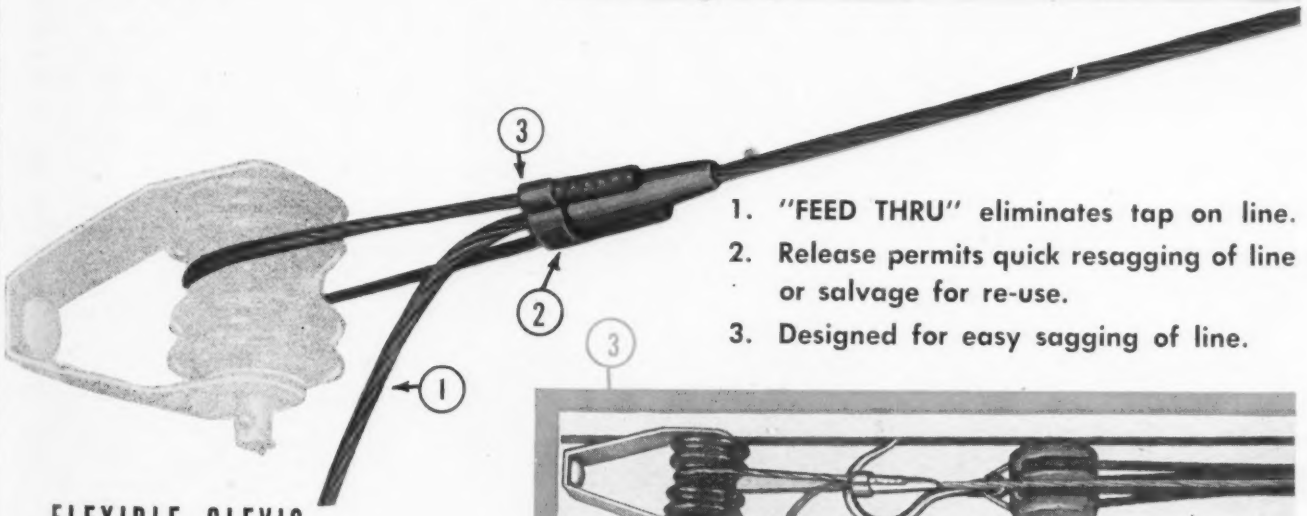
A plug-in type "Megger" insulation tester has been developed by James G. Biddle Co. This rectifier-operated instrument operates on 115 volts a-c; is essentially a modification of the company's "Meg" type insulation tester. The hand generator is replaced by a power pack consisting of a constant-potential, step-up transformer and selenium rectifier giving a constant d-c test voltage. Ratings are available up to 2,000 megohms and 1,000 volts.

Reliable

FEED THRU DEADENDS INSTALLED with minimum EQUIPMENT and LABOR

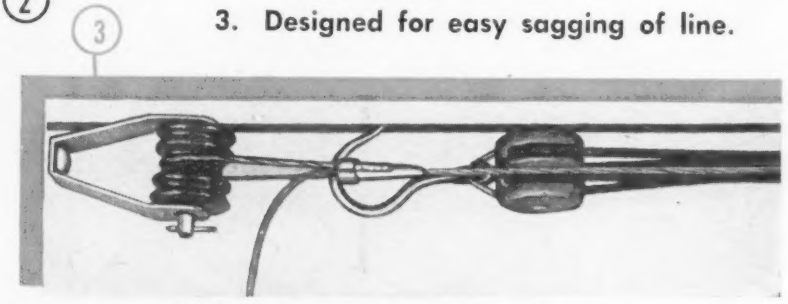
LONG CLEVIS





FLEXIBLE CLEVIS

1. "FEED THRU" eliminates tap on line.
2. Release permits quick resagging of line or salvage for re-use.
3. Designed for easy sagging of line.



Both Styles Available for

COPPER — No. 6 TO 250 MCM
COPPERWELD — 8 A TO 4 A
AMERDUCTOR — 8 TO 4
STEEL — No. 4

Reliable ELECTRIC COMPANY
3145 CARROLL AVENUE CHICAGO 12

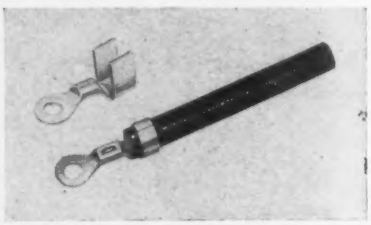
OVER 40 YEARS *Service* TO THE UTILITIES

Now CRESCENT
Aluminum Building Wire
An Excellent Alternate for Copper
250000 CM-AL-600V-RH
COSTS LESS!
PROMPT SHIPMENT!
Aluminum feeders, particularly in the larger sizes show a substantial saving in cost per ampere of useful circuit capacity in most cases as compared with copper. CRESCENT Aluminum Building Wire is made with ENDURITE heat resistant insulation in sizes number 4 AWG to 1,000,000 C. M. as Type RH - 75°C - 600 Volts. Send for Bulletin 471 for complete information.
CRESCENT
WIRE AND CABLE
NEMA
CRESCENT INSULATED WIRE & CABLE CO.
TRENTON, N. J.

Hinged Connectors (606)

O. Z. Electrical Mfg. Co. reports that its new XTP one-piece hinged connectors are available in 25 sizes, accommodating more than 400 wire combinations ranging from No. 8 to 1,000,000 cm. One typical connector in the line does 32 jobs, the manufacturer claims. This device can be permanently attached to the main and left for later attachment of the tap. One end of the connector is snapped over the main and tightened, the other has serrated openings to which a tap can be run in any of three directions. Other construction features: spring steel lock washers (tin plated) to maintain permanent pressure; grip holding serrations on wire contact surface for maximum pull-out strength; non-rotating pressure plates; highly conductive copper alloy body; extra-strength copper alloy hinge and pressure plates.

Terminals (607)



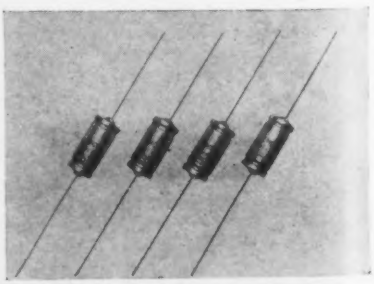
New one-piece small-wire Hylug terminals for conductors with extra-thick insulation are available from Burndy Engineering Co. The U-shaped tabs grip a wide range of insulation sizes and prevent fraying of insulation as well as breakage of conductor strands under extreme vibration, the manufacturer states. A Hytool or Hypress indents the connectors on conductors.

Duplex Connector (608)

A duplex connector announced by Gedney Electric Co. takes PVX armored and nonmetallic cable in sizes from two-conductor No. 14 to three-conductor No. 10. It accommodates two runs of the small cables in a ½-in. knockout. A two-screw clamp provides an equalized squeeze action.

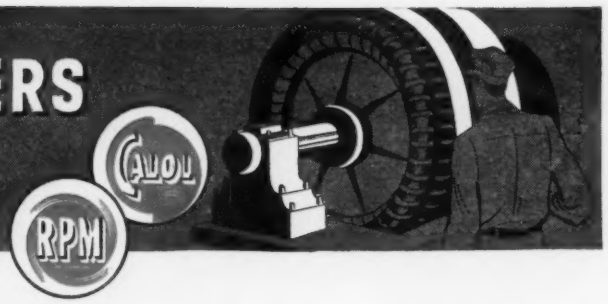
Television Capacitors (609)

Cornell-Dubilier has introduced its Type TMC series of high-voltage capacitors for television equipment. Claimed to be very compact and rugged, these capacitors are housed in tubular, hermetically sealed containers of seamless drawn metal tubing and



are impregnated and filled with Dykanol, a dielectric liquid. They are self supporting since one lead is brought out from each end. Capacities range from .005 to .05 mfd., d-c ratings from 2,000 to 5,000.

STANDARD ENGINEERS NOTEBOOK



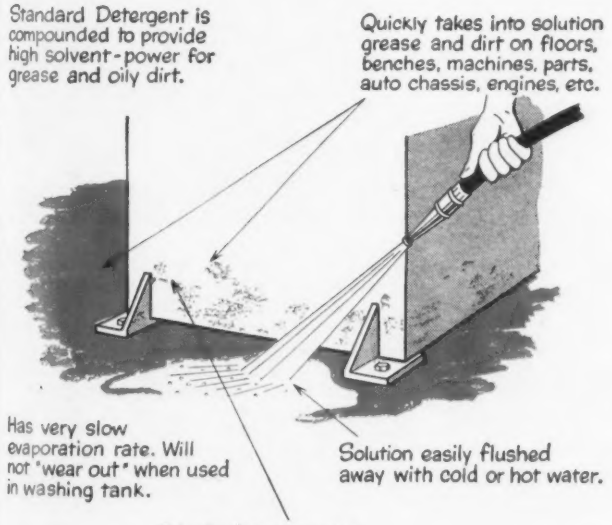
Compounded detergent has high solvent power

Oily accumulations of dirt on shop floors, grease on engines, parts, tanks, etc., and road oil on chassis can be dissolved quickly with Standard Detergent. It contains special compounds to obtain greater solvent power than straight petroleum products.

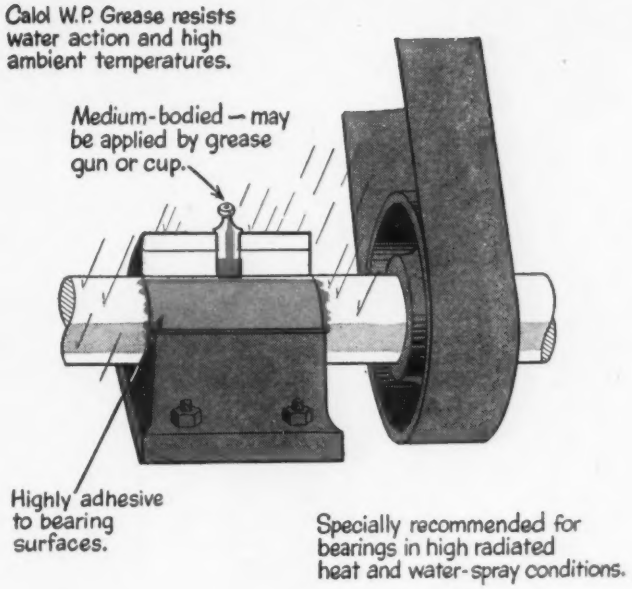
Standard Detergent is a thin-bodied product with a very slow evaporation rate and is non-explosive at room temperatures. It contains nothing that will corrode metal, pit or discolor aluminum and is not harmful to painted or lacquered surfaces.

Easily reclaimed indefinitely by simply removing settled out dirt, Standard Detergent is very economical for washing parts. It need not be heated and will not deteriorate workmen's clothing.

Standard Detergent may be applied by spraying or brushing as well as immersion. The solution it forms with grease or oil rinses off easily with hot or cold water.


Standard Detergent is compounded to provide high solvent-power for grease and oily dirt.
Quickly takes into solution grease and dirt on floors, benches, machines, parts, auto chassis, engines, etc.
Has very slow evaporation rate. Will not "wear out" when used in washing tank.
Solution easily flushed away with cold or hot water.
Standard Detergent is non-corrosive to metal, lacquer, paint.

Trademark "Calol," Reg. U. S. Pat. Off.


Calol W.P. Grease resists water action and high ambient temperatures.
Medium-bodied — may be applied by grease gun or cup.
Highly adhesive to bearing surfaces.
Specially recommended for bearings in high radiated heat and water-spray conditions.

Special grease lubricates in wet, hot conditions

Wherever bearings must operate in the presence of water and are subjected to high ambient temperatures, Calol W. P. Grease is recommended. It is especially recommended for the lubrication of wicket gates on Hydro-Electric turbines, loading arms on coal loaders, hot bed and conveyer bearings subjected to water spray, cannery and bottle-washing equipment.

Calol W. P. Grease is medium-bodied, the proper consistency for application by pressure gun and handles readily under low temperature conditions. It contains no talc, resin, wax or other fillers.

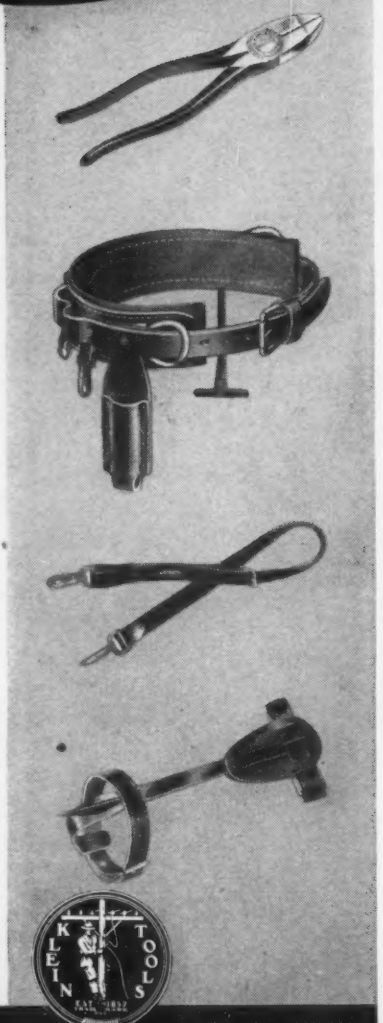
Not affected by the action of water, Calol W. P. Grease adheres tightly to bearings and resists heat in a peculiar manner. It does not melt suddenly at a certain temperature as most greases do, but gradually softens over a wide range of high temperatures.

Calol W. P. Grease is available in 35-, 108- and 420-pound containers.

Standard Fuel and Lubricant Engineers are always at your service. They'll gladly give you expert help — make your maintenance job easier. Call your local Standard Representative or write Standard of California, 225 Bush St., San Francisco 20, California

FOR EVERY NEED A STANDARD OF CALIFORNIA JOB-PROVED PRODUCT

Kleins for safety's sake



Linemen are Kleinmen because they know that their very safety depends on the quality of the equipment they use. Klein has been their standard "since 1857."

***KLEIN CLIMBERS** assure safe trips up and down the pole. They do not cut out.*

***"KLEIN-KORD" RED CENTER SAFETY STRAPS** provide maximum safety—the Red Center unmistakably signals when the strap should be replaced.*

***"KLEIN-KORD" TOOL BELTS** give the safety, comfort and convenience needed for fast, efficient work.*

***KLEIN PLIERS** with their proper balance, sharp knives and matched jaws help in doing any wiring job better, quicker.*

Be sure to equip your linemen with Klein Pliers and equipment. Your supplier will fill your order as rapidly as possible.

Ask Your Supplier

Foreign Distributor: **International Standard Electric Corp., New York**

The Klein Pocket Tool Guide showing the Klein line and containing useful tool information will be sent on request.

Since 1857

Mathias KLEIN & Sons

Established 1857 **Chicago, Ill., U.S.A.**

3200 BELMONT AVENUE, CHICAGO 18, ILLINOIS

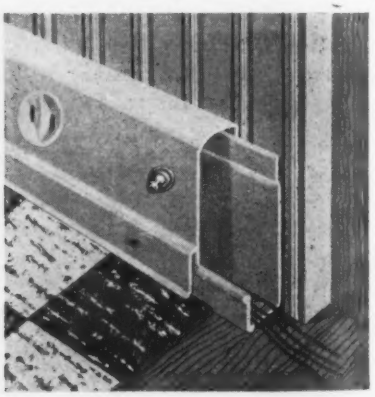
Positioning Control (610)

An electronic positioning control system developed by General Electric has three parts: a master control station and a follow-up device (which can be either small selsyns or potentiometers, depending upon the application) and an electronic control panel. The driving motor is not included in the system because any reversing a-c or d-c motor that can handle the load is acceptable, the company states. The master control station is connected to the control panel by three control leads. To operate, a dial is set in the same manner as a radio dial and the motor moves the load to a new position corresponding to that of the dial. The system may be used on drives up to 1½ hp. in general and on many drives over this rating, after a consideration of load inertia, speed, gear reducer arrangement, accuracy of positioning needs.

Rheostat (611)

Electric Regulator Corp. is offering the Regohm, a new product in the automatic rheostat field. The device has a plug-in mounting. Coil consumption is 1 watt; with voltage dropping resistor (optional) about 5 watts. Coil supplied for d-c only; for a-c a small dry disc rectifier is required. Sensitivity is plus or minus 2% or better. Ten steps of control resistance at up to 8 watts per step with 80 watts maximum total. Ohmic values are limited only by design requirements, the manufacturer states. Inherent resistence of contacts is 0.1 ohms; maximum current 4.0 amp.

Aluminum Base (612)



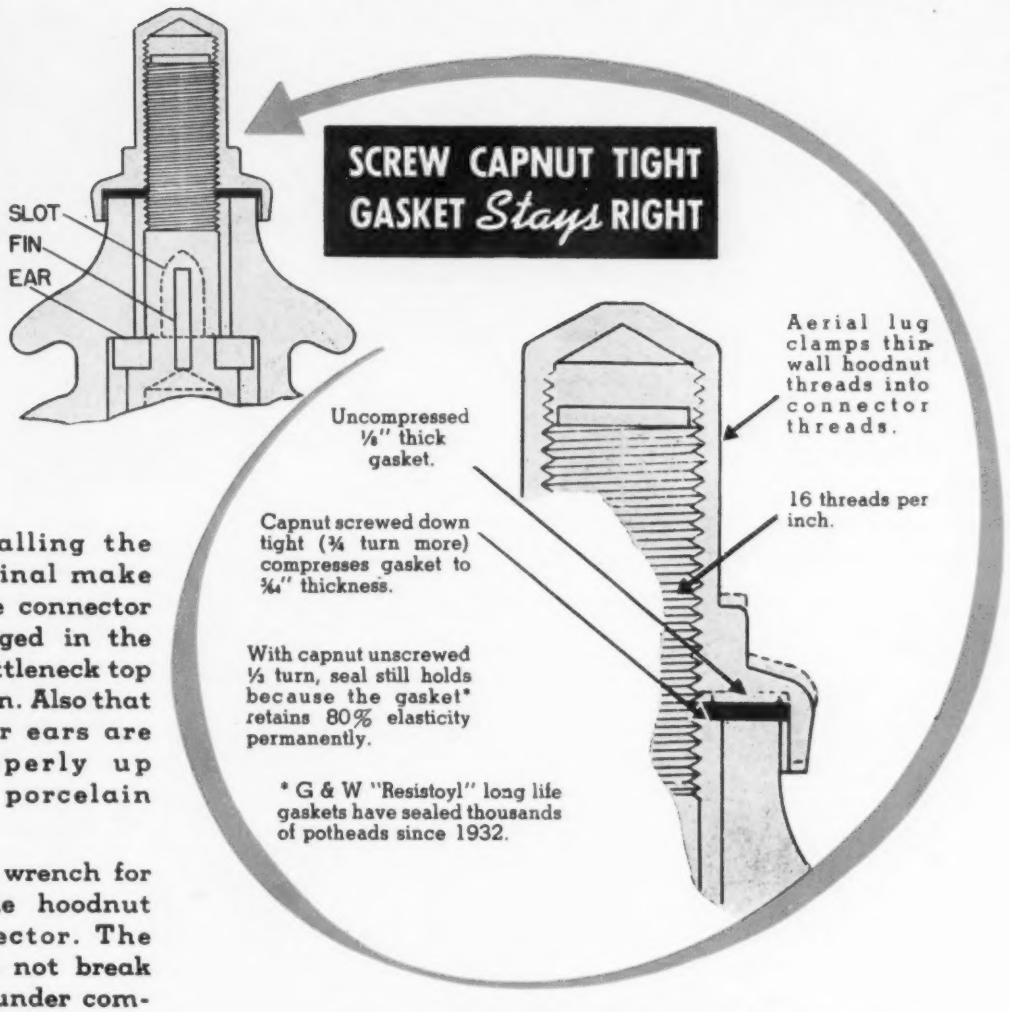
Barnes wire-hiway base, Despatcher model, provides for wiring and anchors partitions. Four screws in rear member will install up to 10 ft. This base is made of satin-finish, extruded aluminum which can be painted if desired. It is 3½ in. high, coved top and bottom. Front panel is removable and wiring is accessible yet concealed. Outlets may be provided wherever required; a foot-operated switch is included. Other models with dual hiways are available for institutions, industrial plants and office buildings.

Safety Switch (613)

Pelham Electric Mfg. Corp. is offering the "Rota-Swing" safety switch for switchboards or panels of 0 to 600 amp., 250 volts d-c to 600 volts a-c, 2, 3 or 4 pole. Act of opening the door to reach the fuses automatically opens the circuit, according to the announcement. A rotating handle moves the knife blades to off or on position, while the switch is disconnected. Steel guides hold the blades in alignment.

THE FOLLOWING G & W WESTERN REPRESENTATIVES—
R. E. Cunningham & Son, Los Angeles; F. W. Gorman, El Paso; W. R. Hendrey Co., Seattle; C. E. Ingalls, San Francisco; Mountain States Mchy. Co., Denver; Riter Eng'g Co., Salt Lake City, recommend G & W potheads.

HERE'S THE SECRET OF THE PERMANENT SEAL IN G & W CAPNUT POTHEADS!


SLOT
FIN
EAR
SCREW CAPNUT TIGHT
GASKET Stays RIGHT
Aerial lug clamps thin-wall hoodnut threads into connector threads.
Uncompressed 1/8" thick gasket.
16 threads per inch.
Capnut screwed down tight (¾ turn more) compresses gasket to 3/64" thickness.
With capnut unscrewed ⅓ turn, seal still holds because the gasket* retains 80% elasticity permanently.
* G & W "Resistoyl" long life gaskets have sealed thousands of potheads since 1932.

When installing the capnut-terminal make sure that the connector fins are engaged in the slots in the bottleneck top of the porcelain. Also that the connector ears are seated properly up against the porcelain shoulder.

Use a large wrench for tightening the hoodnut on the connector. The porcelain will not break because it is under compression.

After hoodnut has been screwed down in contact with the gasket, tighten it another ¾ turn for a permanent seal. When so clamped, vibration cannot rotate the hoodnut the ½ turn which would be required to relieve gasket compression.

G & W ELECTRIC SPECIALTY CO.
7780 DANTE AVENUE CHICAGO 19, ILLINOIS
Also made in Canada by POWERLITE DEVICES, LTD., Toronto

There's no real substitute for *A*rmored, *B*onded and *B*ushed Cable!

It is the only general-purpose, *ready-to-use,* metal-protected, approved system of wiring!

It provides the lowest cost, *METAL-ENCLOSED* wiring system, and guarantees a SAFE, FOOLPROOF installation!

*And Now_* **TWO Paths to Ground for sizes No. 14 and No. 12!**

1. **A new, low-resistance, flat, grounding strip in contact with the armor.**
2. **The armor itself with *"bondhook"* channel construction to assure a positive path to ground.**

(Sold through leading electrical wholesalers)

OTHER A. B. C. FEATURES

"Dilec Firestop" insulated wires—Moisture resistant, flame retardant, easy to strip.

Anti-Short Bushing—Protects the wires from sharp armor edges.

Flexibility without interfering with grounding contact between armor convolutions

National Electric Products Corporation
Pittsburgh 30, Pa.

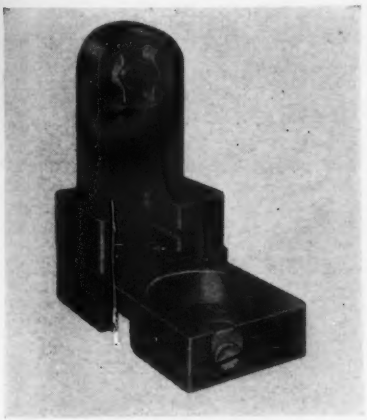
Splashproof Motor (614)

General Electric has redesigned its low-speed synchronous motor line to include splashproof construction. The manufacturer states that simple design makes it easy to remove and assemble end-shield covers when inspecting the motor. The pedestal bearings are outside the housing, permitting regular inspection of oil supply and oil ring operation. New space-saving frame construction uses louvered openings for the side air discharge instead of the flared-skirt type opening. The conduit box is included in the frame structure to protect it from splashing liquids. An inspection window in the air chute gives a view of the brush holder and collector without removal of the covers.

Multibreaker (615)

Cutler-Hammer has introduced a small, multibreaker, the MO-4, combining four breaker poles which can be used as single-pole circuits or, by insertion of a tie rod, can be converted to one or two double-pole, 3-wire solid neutral circuits. This unit has thermal overload protection and magnetic protection; carries a 50-amp. maximum solid main rating, with individual single poles rated at 15, 20 or 30 amp.

Lampholders (616)



Solar Electric Corp. is making a line of fluorescent lampholders and lampholder-starter sockets for use in original equipment and replacement. They are made of chip-proof, shock-proof bakelite with high dielectric strength. Slots in lampholders guide lamp ends into position, a twist of the lamp locks lamp into holder. These devices fit all standard fluorescent strips, troffers, luminaires; are available in black or ivory; approved by Underwriters' Laboratories.

Projection Lamp (617)

Westinghouse has a new high-efficiency tungsten filament lamp for slide film projectors. Specifications: 300 watts, 115, 120, 125 volts; T-12 black top bulb; medium prefocus base; C-13D biplane filament 6.7 mm. wide by 6.7 mm. high; 25-hr. life; 25 lumens per watt; 2 3/16 in. to light center and 5-in. over-all length.

Luminaire (618)

Bright Light has added the Vanguard to its Silv-A-King line of fluorescent equipment. It is of a modified V design with eggcrate louvers. Side glass panels of frosted ribbed glass are top-hinged; end sections are slotted. Canopy and stems are optional.

Announcing

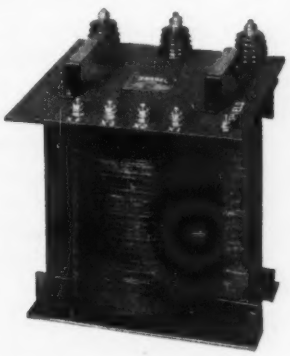
Greater Plant Capacity

With an addition to our plant now being built, and with more and improved equipment, we will increase our production and improve our deliveries to meet the growing demand for

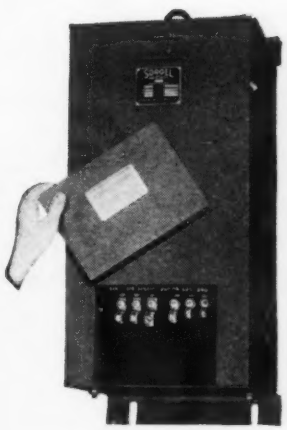
SORGEL
AIR-COOLED
TRANSFORMERS

A size and type for every purpose.
¼ KVA to 1000 KVA. All voltages.
Single phase and poly-phase.

¼ KVA.
Single Phase
460/230 to
115 Volt



Special 4600 Volt
Electronic Transformer



15 KVA. 3-phase
Wall Mounting Type
Showing connection
Compartment with
solderless terminals

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Pioneers in the development and manufacturing of Air-Cooled Transformers

Defy Heat!

Heat holds no terrors for the "fire-eater" — or for Collyer Asbestos Wires. The heavy overloads and hot locations that break down ordinary insulations do not affect Collyer asbestos. Where moisture, corrosive vapors, and heat up to 230° F. are expected, Collyer Asbestos Varnished Cambric (A.V.C.) insulation is recommended. Made by improved methods, with new non-toxic resin impregnating compounds, this wire is ideal for control and power circuits in steel mills, foundries, mines, and boiler rooms, for voltages up to 7500. Collyer All-Asbestos Wire withstands extreme temperature, up to 400° F. under dry conditions, on rheostats, control panels, heating equipment, etc., and gives maximum protection against overloads or high ambient temperatures.

Write for information

Collyer INSULATED WIRE CO.

245 ROOSEVELT AVE., PAWTUCKET, R. I.

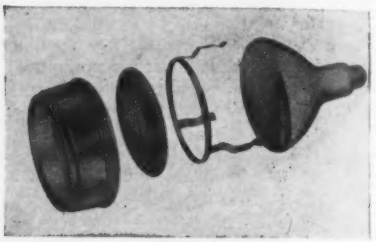
ALLIED INDUSTRIES, INC., San Francisco, Los Angeles, Seattle

Accoustical Board (619)

An accoustical board for use with recessed type fluoresent light troffers is offered by Owens-Corning Fiberglas Corp. The board is composed of specially processed glass fibers treated with a thermosetting resin, is available in 1-in. thickness in two sizes 25½ x 48 in. and 24 x 48 in. It is beveled and cross-grooved to simulate tile and is painted white. Light coefficient is 0.75 to 0.80. Board is non-combustible; is said to span 24 in. without sag and without cross support. Weight is 0.75 lb. per sq. ft.

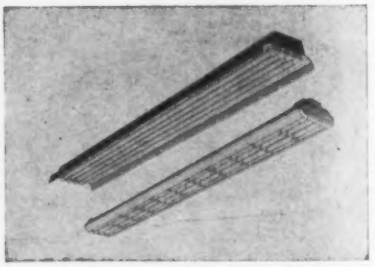
Color Filters (620)

For merchandising display, an aluminum clip with interchangeable color filters has been designed by Sylvania to fit any R40 reflector type lamp. This Birdseye color clip is available with 16 filters, ranging from one-tone primary colors to two-tone hues. Weight of assembled unit is 5 oz.



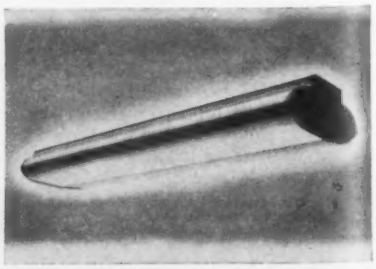
F Fixtures (621)

Leader will offer a New Horizon series of fluorescent fixtures for slimline tubes. Included are commercial and industrial fixtures said to give lower surface brightness and reduced installation costs.



Bending Action (622)

Holophane has announced the Holoflux unit, equipped with a new curved type Controlens which collects light from the lamp and bends it downward in an intensive pattern to give maximum illumination over useful areas. This bending action is said to eliminate glare at normal viewing angles. Luminous background is given by the upper refracting section of the unit. The Holoflux unit is 8⅜ in. deep.



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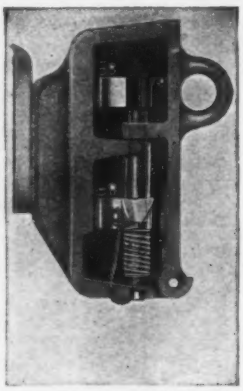
Definitely West-*wide!* That's Fuller Service—with 44 branches stocking industrial and maintenance finishes (also special finishes where needed), and with factories and laboratories centrally located so our technicians can give prompt service when individual specifications require first-hand attention. Dependable, fast service from the West's best-equipped makers of finishes for industrial use. W. P. Fuller & Co., San Francisco 19, California.

FULLER FINISHES



Dropdown Indicating
MATTHEWS CUTOUTS.

SAFER,
if closed in on short because it is tripfree.

COOLEST,
because of good old fashioned pressure-area contacts. Contacts free from radio noise.

PATENTED SLACK REMOVER,
will automatically take up 3/8 inch of slack fuse link which prevents false outages, and burned contacts.

ALWAYS INDICATES
when fuse link parts—even if door is frozen shut. See drawing below.

NORMAL TENSION
on link is less than 2½ lbs., therefore over-stressing or breaking of links is impossible.

YEARS
of successful service for many thousands prove their efficiency.

Try Them At Our Risk. Write For Complete Bulletin.

W. N. MATTHEWS CORPORATION
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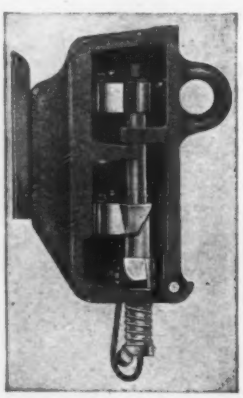

BULLETINS ETC.

Network Protectors (623)

GEA-2017C, a 39-page, two-color bulletin gives details of construction, applications, and maintenance requirements of General Electric network protectors for a-c secondary systems. Fifty-five photographs and charts illustrate the uses, accessibility and features of the network protectors. A section on selection of fuses for the equipment contains curves of time-current characteristics.

Aviation Products (624)

Products and research facilities for the aviation industry are outlined in a new 16-page booklet announced by Westinghouse Electric Corp. This booklet (B-3775) lists eleven of the company's plants serving the aircraft industry and describes their research, engineering and production programs.

Truck Restrictions (625)

Four Wheel Auto Co. has issued the 1947 edition of its "Truck and Trailer Size and Weight Restrictions." Information is compiled by states and was checked by state officials, the company reports.

Insulation Tester (626)

James G. Biddle Co.'s Bulletin 21-60 describes its Bridge-Meg type of Megger insulation and resistance tester.

Controls (627)

Wheelco electronic controls are described in a 20-page booklet offered by Wheelco Instruments Co.

Communication Equipment (628)

A communications equipment booklet offered by Westinghouse Electric Corp. covers parts and materials for radio transmitters and receivers, radar, telephone apparatus, electronic heating sets and controls. Application data, performance curves and charts are included.

Connectors (629)

Cannon Electric Development Co. has prepared a 76-page booklet, "Cannon Plugs for the Electric Circuits of Industry," giving information on assembly, servicing, maintenance, portability of electric equipment through use of connectors.

Receptacles (630)

"Floor Boxes and Accessories" issued by Russell & Stoll Co. describes the company's line of watertight floor boxes and receptacles, combination floor extension sets, floor outlet type receptacles, heavy-duty floor receptacles, plugs, etc. It is designated catalog FB147-16.

Cable Protection (631)

Cable protection is the subject of Technical Bulletin 46Z3 published by Burndy Engineering Co. in connection with its development of high-capacity limiters for industrial network systems up to 600 volts.

Adequate Wiring System (632)

Pass & Seymour's booklet, "Are You Going to Build, Modernize or Repair," describes an adequate wiring system for the modern home. It is written for the layman and is attractively illustrated.

Glass (633)

"Looking at Engineering Problems through Glass" is the title of a recent publication of Kopp Glass, Inc.

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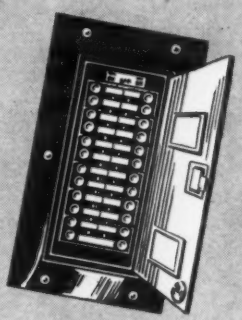

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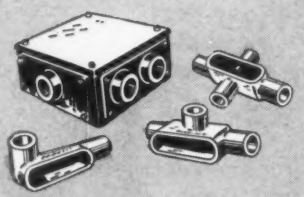

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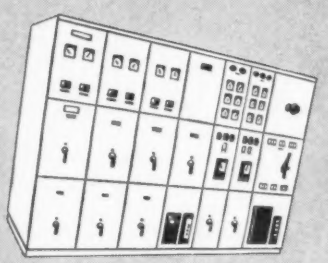
★ ★ ★



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1153

ELECTRA'S HUSBAND

LIGHT CAN CHECK NIGHT ACCIDENTS

ELECTRA was shaken and upset when I walked into the house late one night recently. She should have been in bed, for I had said that I would not be home until around midnight. But she was in the living room, apparently making a valiant effort to read *Why They Behave Like Russians.*

"What happened," I asked. "Bad news of some sort?"

"It might just as well have been," she answered. "Did you ever see a person killed?"

"A couple in my newspaper days," I said, "but what happened to you?"

"Well I walked down to the neighborhood theater after dinner," she said. "On my way home about ten o'clock I was standing on the corner at Van Ness and a car hit an elderly woman. It knocked her about a hundred feet and killed her instantly. Apparently she had tried crossing just before the signal changed and only reached the middle of the intersection. She must have become confused, because this car came down the hill and hit her a terrible blow."

"It must have been harrowing," I said. "It's too bad you had to be there."

"The boy driving the car was pathetic," she continued. "He kept repeating over and over, 'I couldn't see her. I couldn't see her.' Probably he could not either. I know I didn't."

"She must have had on dark clothes," I commented.

"She did," Electra said, "a black coat and black dress. Why in heaven's name can't they do something about lighting a street such as Van Ness? With any kind of decent lighting the boy would have seen her in time to stop. If you ask me, your electrical industry has a big job to do in street and highway lighting. I even hate to see you take the car out at nights."

"I'll agree with all of that, my dear," I said trying to calm her. "Even as to driving the car at night. Your little old lady who was killed tonight is only one of a possible 11,055 people who will be killed in 1947 because they or their killers, and I use that word advisedly, won't be able to see adequately for safety. That prediction is based upon a continuation of the 1946 fatality rate. My own guess is that it will be higher because of the increasing number of autos.

"Unfortunately a lot of the victims of these after dark accidents will be elderly people, like the woman you saw tonight. In fact statistics collected by the Street and Highway Safety Lighting Bureau show that well over half will be 45 or older. Unlike daytime accidents, few will be children."

"Statistics like that don't impress me," Electra fumed. "I *saw* a woman needlessly killed. Why can't something be done to stop such tragedies?"

"I sympathize with you, dear lady," I said, "but dark hour traffic safety requires drastic action and an aroused public like yourself at this particular moment, as well as action by public bodies and finally money.

"Safety campaigns built around daylight conditions have not checked and cannot check night traffic accidents and deaths because they simply don't apply after dark. In traffic you have to be able to see to be safe. To see, your eyes must have light. It's as simple as that."

"But you just said it's a complicated problem to get safety lighting," Electra interrupted.

"The lighting part itself isn't complicated," I said. "It's the overcoming public inertia and complacency that's difficult. The whole history of street lighting proves that. Darkness has always been one of man's enemies. He has fought it since the very beginning.

"His discovery of fire was his first victory. With it came the beginnings of light and safety. First it was a burning brand used as a torch and later a wick fed by animal or vegetable fat. The Romans did the first organized job of outside lighting by suspending oil lamps on poles. But these lights went out along with the Roman empire and for a thousand years nothing was done. Then in the 15th century the idea of street lighting was revived in London and Paris, principally in an effort to combat robberies and other crimes. Hanging lanterns, street corner torches and various types of lamps were tried. At one time in London there were 15,000 street lamps to brighten the way of the nocturnal wayfarer. In 1807 gas lighting was introduced and in 1877 the first electric arc lights."

"Even you will have to admit that there hasn't been much progress since then," Electra jibed.

"I wouldn't say that," I continued. "After all most of the country's street lighting is up to the level recommended by experts as safety lighting for alleys. The average street lighting today is only one-quarter of the intensity recommended for safety with heavy traffic, and even that is far short of the ideal."

"That's what Van Ness must have—alley lighting," Electra speculated. "And a dark alley at that. As careful as I drive, I could not have seen that woman. Just think if you or I had had an accident like that."

"We might have—any dark night," I said. "Most drivers today out-drive their headlights. By that I mean they couldn't stop their car even if they saw someone in the way."

"We aren't accomplishing anything with all of this talk," Electra said. "What can someone like I do about it?"

"Tell your friends what's needed so that real support will be put behind the officials who want to correct the situation," I said. "Chief of Police Dulles says San Francisco is not adequately equipped with street lighting from a traffic safety standpoint. He claims adequate lighting would reduce nighttime vehicular accidents at intersections by 40 per cent and those involving pedestrians such as you saw tonight by 60 per cent. The same reasoning would hold for almost every city on the Coast."

"Well then in Heaven's name get that kind of a story over to the right people," Electra said. "What this city and every other one in the whole country needs is adequate street lighting. I'm going to preach that after what I saw tonight."

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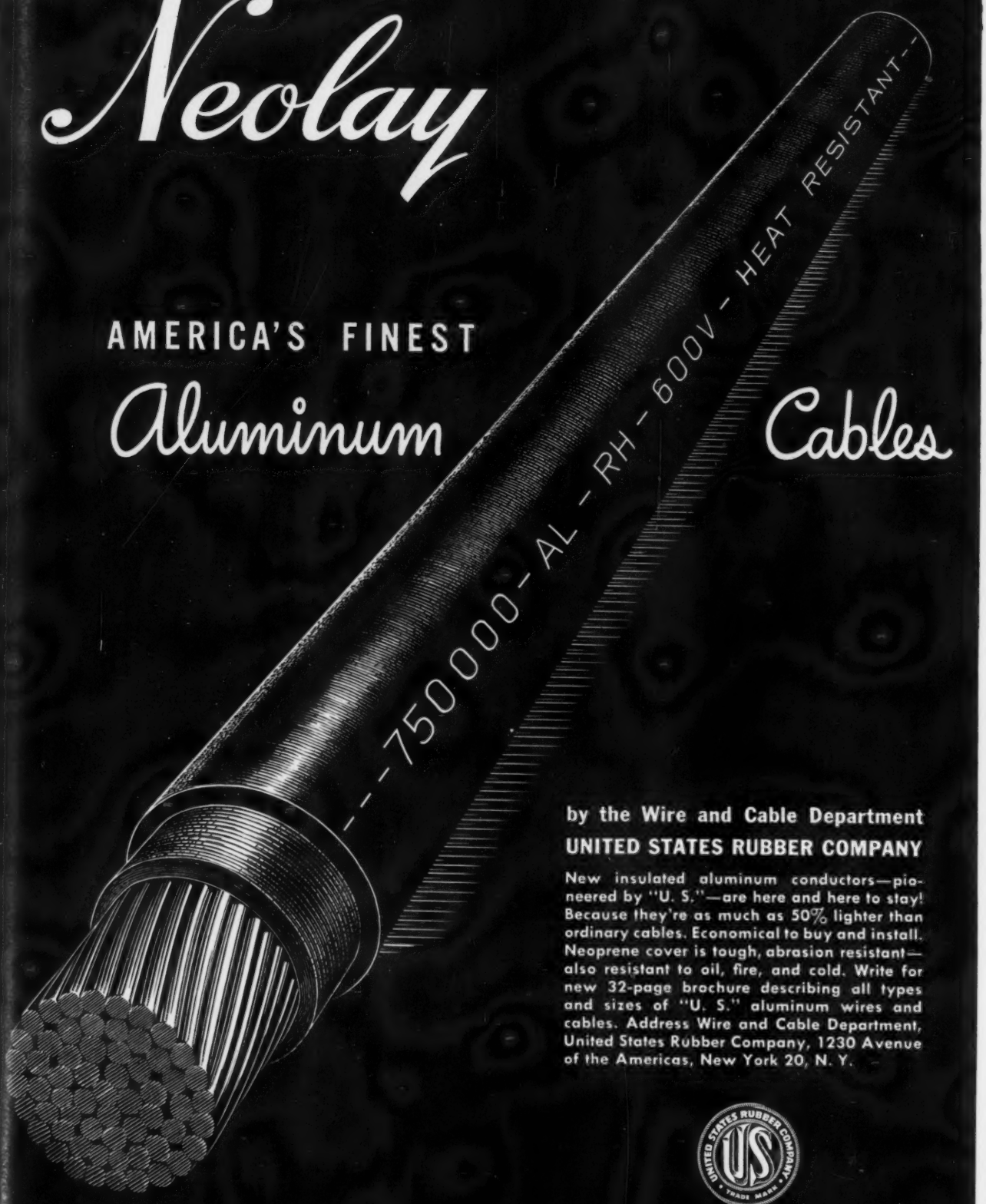

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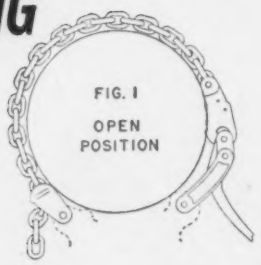
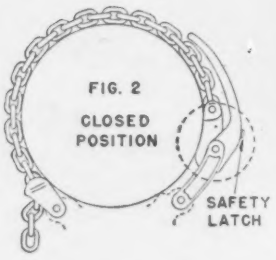
The illustrations at right show the steps of application. First, the chain is wrapped around the pole and engaged in the chain socket while the tightening lever is in open position. (Fig. 1) To tighten, the lever is moved to closed position (Fig. 2) and the safety catch automatically latches. If chain is too loose, the tightener may be released and the chain taken up a link in the chain socket, or a half link adjustment can be made in the take up. (Fig. 3) It is necessary to depress the safety latch and at the same time pull the lever as suggested in the lower photograph in order to release the tightener. Thus, there is no danger of a lineman accidentally loosening the tightener.





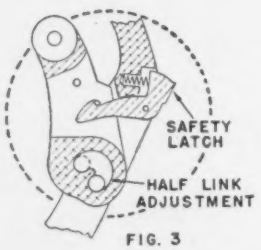
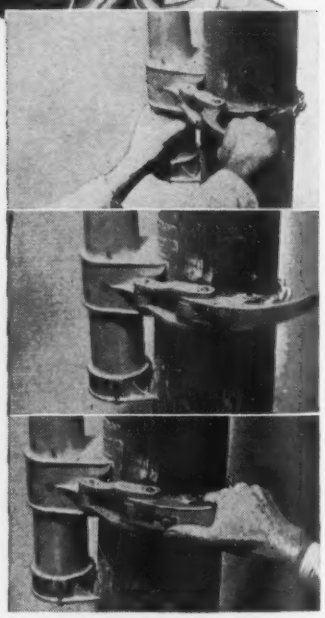


FIG. 3



- **Speed in attaching equipment to poles.**
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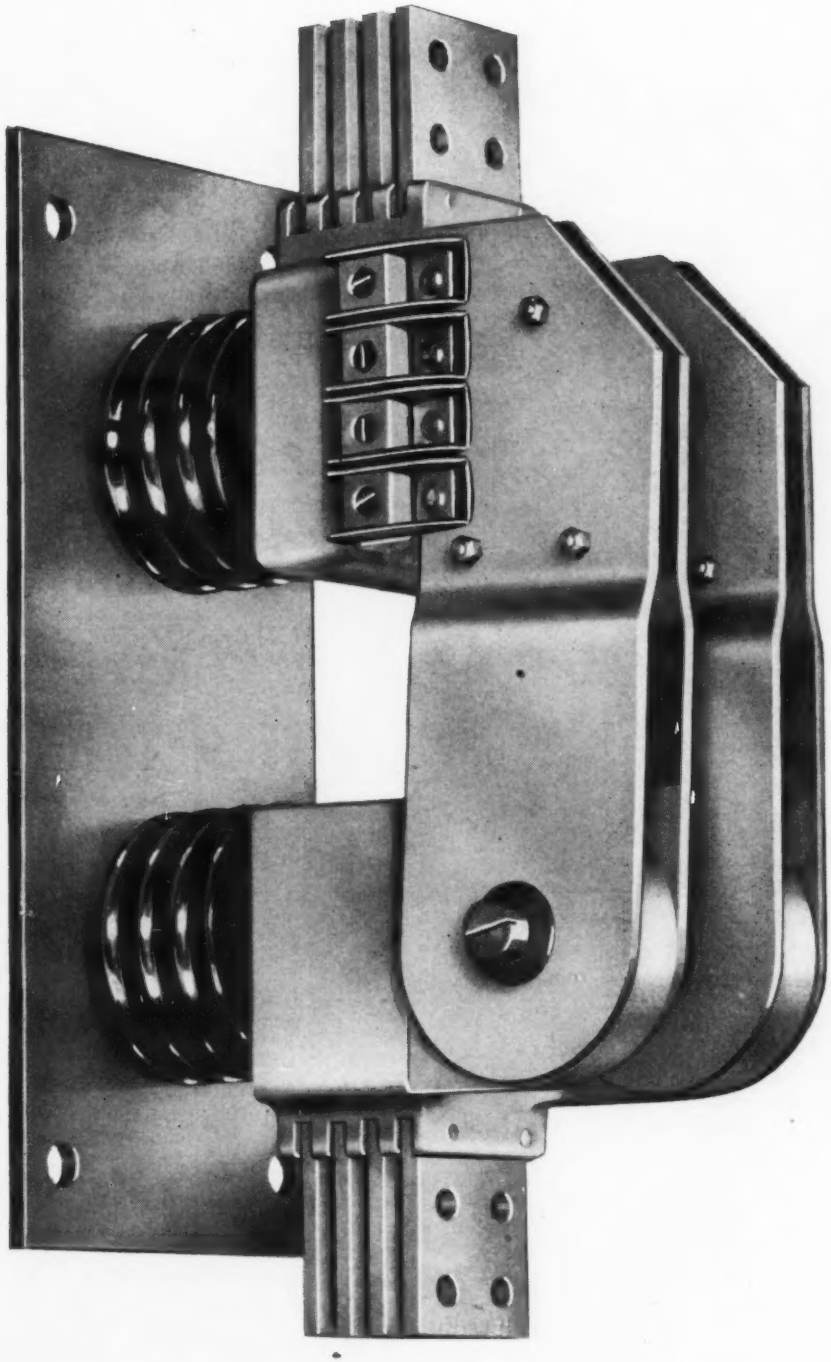

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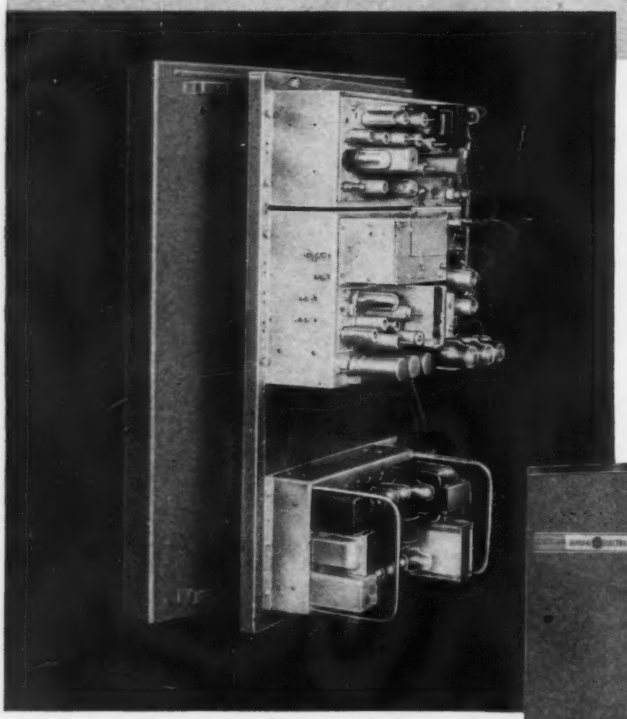

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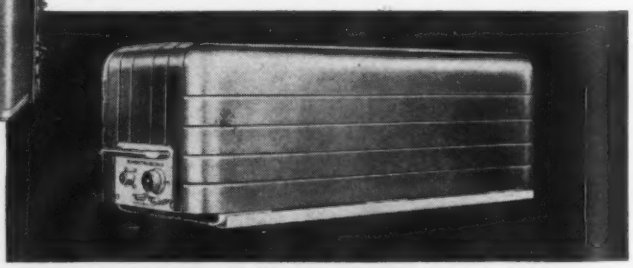
IN EVERY operation where instant, reliable contact is required, General Electric's new 152-162 mc 2-way communications equipment can be depended upon. Here is a *complete* system that aids in systematizing and coordinating operations. It is filled with features that mean better performance, longer life, greater dependability.



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1. Hinged rack construction provides maximum accessibility.
2. Wall-mounted cabinet—zero floor space required.
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4. Full 50 watts output—tubes and components operated well under ratings.
5. Meets proposed RMA standards—high attenuation of spurious receiver response and spurious transmitter and receiver radiation.
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Be sure of results—let General Electric handle the complete job from microphone to antenna. General Electric engineers are located in principal cities. For complete information and assistance in planning your radio system, call or write your nearest General Electric office or the General Electric Company, Electronics Department, Syracuse 1, New York.

MOBILE STATION FEATURES

1. Single-unit chassis—plug-in, draw-out construction.
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4. Meets proposed RMA standards.
5. Temperature-controlled transmitter crystal—the reliable General Electric Thermocell Crystal.
6. Alnico V 6½ inch speakers.
7. Accessories to fit the basic units to your requirements.

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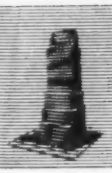
JUNE 1947 Vol. 98, No. 6

ELECTRICAL WEST

SPOKESMAN FOR THE MOST HIGHLY ELECTRIFIED SECTION OF THE U. S.



OPPORTUNITIES AND OPTIMISM

BY its very nature the electrical business is one conceived and built by optimists. Whatever branch of the industry one chooses, whatever the size of the unit or whatever the stage of its growth, optimism will be found to be the motivating force that drives the organization ahead. It is an optimism founded on faith in the future, confidence in the worthwhileness of the task in hand and a cheerful view of the road ahead, irrespective of obstacles. It is an optimism that has its roots in the basic freedoms of American life—the freedom to enter or leave business at will, to start small and grow big, to expand or contract, the freedom to be as enterprising as one wishes.

So long as this vibrant optimism can be maintained there is no need to worry about the future of the industry. However, at times there appear to be increasing threats to the ability of the industry to face the future with zest and cheer. And the list of problems now seems longer that at times past. Among these problems—old and new, simple and difficult—are included such things as the continuing shortages of critical materials; no surcease from government regulation and control; the continued threat of inflation; mounting costs for doing business; the pressure of labor for greater and greater "gains"; the compounding of mounting demands for service and unpredictable weather with a resultant threat of power shortage; costs that force prices up to a point where the industry may truly be priced out of some markets.

For an industry as dynamic as the electrical business to view these multiple and difficult problems with either pessimism or alarm is both unbecoming and foreign. The electrical industry was born of complexities and grew up overcoming one difficulty after another. Each new problem was looked upon as an opportunity and the search for a solution was accepted as a part of the game. Just a casual look at the milestones which mark the industry's progress will prove how true this is. As complex and overpowering as an immediate problem might seem, the men and women in the industry have always had the perseverance, the imagination and the determination to find the right answer.

This is a spirit that should and must be preserved. Our industry cannot be so complacent, so mature or so static that it is willing to sit back and find excuses for conditions that require action. Such a do-nothing attitude does not square with tradition.

In the pages of this convention issue of ELECTRICAL WEST there are set forth some of the major and pressing problems that confront the industry today, with suggestions as to how solutions might be approached. They represent a challenge to the younger people in the industry to display the qualities of leadership that have made this business great. They are the opportunities that will become the milestones on which future generations will look back and marvel.

George C. Tenney

EDITOR

GRASSROOTS LEADERSHIP

is what the electrical industry needs today, according to MILTON G. SANDERS, dynamic young president of Pacific Coast Electrical Association. The bosses can't solve all of the problems in these perplexing times and he points out that the great opportunity for the young men and women in the industry is to seek solutions themselves. With leadership stemming from the bottom, nothing can stop the industry's progress

SOMETIMES I think we have too many tellers-what's-wrong and not enough doers-something-about-it in the electrical industry. Not, you understand, that I think there is nothing wrong with our industry. We have plenty of problems and as we progress our problems become, if anything, more complex. But the complexity of our common problems is, I believe, the great opportunity for those of us who are not presidents of the companies we represent. Because it is only through our individual recognition of these opportunities that we are going to have the leadership in the many many years ahead of us.

Let's look at some of these opportunity problems.

Probably the most important problem is that of human relations within our industry. Call it industrial relations, employee relations, personnel relations, or whatever you like, it is one of the most, if not the most, important problems, we have in all industry. Some companies have done a great deal of excellent work in this direction. Some have not done too well. It may be that in your own company, in your own department, you can find room for improved personnel relations. If your own company's personnel program is not perfect—and it probably isn't—have you contributed to the thinking or working out of a plan to improve it? Have you been content to say, "That's the management's job. Why don't they do this, why don't they do that?" Or have you made a conscientious effort to plan a workable program and see it through? There is plenty of work to be done. There is a good opportunity for ideas—if they are worked out.

Then there is the matter of a public information program for our industry. There is probably more *mis*information about our industry than any other. We are frequently criticized for not telling "our side" of the story as well as we should. The politicians tell the people about us. Those of opposing economic philosophies tell people about us. A lot of people are telling the public about us; not necessarily factually, but probably louder than we are telling our story. There is an opportunity for thinking. How much thought have you given to ideas as to what might be done in your own community to better acquaint your customers with your side of the story? Or are you waiting for somebody in top management to dream up a policy, work out a program? You know, *somebody* is going to have to work this thing out.

Here is another one for you. Did you ever hear of liquid petroleum gas? Do you know how the "LPG" industry has grown since we slowed down our new business activities during the war? Have you any idea of the thousands upon thousands of range and water heating installations that have been made? You probably know more about it than I do, but more important, do you know that nobody has cooked up the answer to that one yet? There are a few men giving intelligent study to this problem, but what is going to be done about it?

I hope no one here says, "Yeah, they could do something about it if they would only do something about range wiring and installation costs." There is another opportunity. That problem of range wiring and installation costs is a headache for the whole electrical industry—the manufacturer, the distributor, the contractor and the dealer and the utility. It is holding up the parade. The whole industry is waiting for somebody to come up with a smart plan to whip this problem. Your company hasn't figured it out, either. Maybe it's an opportunity for you.

I'm not going to remind you of all the problems in the industry, because you know them. You probably know them so well you walk around them. But I would like to mention one that appeals to me as typical of the basic problems that we don't pay much attention to. I'm talking about electric rates—and maybe I shouldn't. I'm not talking about the cost of our service. The history of our utility industry in the matter of costs to the customer is something of which we may all be justly proud. I'm talking about the cockeyed system we use for billing our customers for the service we render.

In our end of the business everything is based upon kilowatts. Our plant investment is so much per kilowatt. Our operating problems are all with kilowatts. We talk about kilowatt capacity of generating plants, substations, transmission lines, and distribution systems.

The customers' end of the business is based upon service. We tell them they are buying food preservation, food preparation, hot water, cool comfort. We tell them they are buying health and labor-saving services. We tell them they are buying low production costs or acre-feet of water.

And what do we bill our customers for? Kilowatt-hours. Do you know what a kilowatt-hour is? Did you ever try to explain a kilowatt-hour to a customer? Did you ever get your explanation across? Of course it is an honest measurement of energy use, but what customer understands it? You may say that kilowatt-hours are the only means by which we can bill our normal service. I say to you that there must be a better way. What difference do kilowatt-hours make in residential service anyway? Thirty years ago our customers used about half what they use today and they pay just about the same amount of money for twice as many of your kilowatt-hours! I promise you somebody is going to develop a better way of billing our customers so they will have a better understanding of what they are paying for.

But no. Most of us are waiting for the president or top management to either figure out or get the original idea for most of our problems.

A friend of mine who was associated

with Dale Carnegie for several years was telling me why Carnegie's book, *How to Win Friends and Influence People*, had such a tremendous sale. A lot of you have probably read it. But do you know why it sold up into the millions? Do you think it was because people wanted to improve themselves? Not on your life! I'll tell you how it worked with me. Someone gave me a copy and I read it. After I finished I didn't go off in a corner and say, "Sanders, old boy, you've got to mend your ways. Got to quit being so smug and selfish. Got to consider other people." Oh, no! Soon as I finished it I said, "That's just the book for the Boss! It will do him a lot of good!" So I gave him a copy. He read it and said, "That's just the thing for my employees!" And he bought a hundred or so and gave them to his key people!

So I say let's not depend entirely on the president and top management for all the ideas and plans and programs we need in our industry. They are too busy fitting plans together, keeping things running. Look to your leaders for leadership today, but remember the leadership of the future has got to come from us. We are the ones who have to take these problems to heart and work them out.

We can't pop in on the boss and say, "Look, Boss, we gotta do something about this bottled gas business; it's raising hell with our cooking load!" We can't say, "Don't you think it would be a good idea for us to put in a pension plan like they got over at the XYZ company?"

We can't hand the boss another problem. He has plenty of those. He wants to see the problem presented thoroughly. He wants to see a thorough analysis of it and a complete plan for its solution with costs and results.

The boss is said to be the man who thinks and plans furthest ahead. He sees in terms of figures, percentages, ratios, charts, graphs, balance sheets, costs, taxes, profits and dividends. He has to be persuaded that the idea you have is the answer to the problem. He can't afford to stick his neck out on some half-baked dream you had. He has to know there is a reasonable chance that you have the answer.

It isn't easy to go beyond simply getting the idea. That is just when the work begins, and if your idea is any good it is worth working out to the last detail.

Then you have to stick by your plan through argument and head shaking. If it is a good plan it will stand up. If it won't you better get another one.

Don't forget that a lot of people are going to pooh-pooh your idea and plan just because they did not think of it.

It's a long, hard, and sometimes thankless drag. But you will find, I am sure, that every good innovation in any industry, particularly ours, has come about only after a long hard fight. Change comes slowly. Look at the best personnel program you can find in any of the companies of our industry. You will find that it is in effect only because some guy with a lot of intestinal fortitude wouldn't give up. Maybe he got help, he probably did, but it takes the heart of a crusader and a lot of the stuff they make violin strings of to get new ideas going.

But that is the kind of stuff leaders are made of. That is where the opportunity lies for you and me in this industry . . . because *everybody* won't go through all this trouble to get the job done.

The only way our industry can lead the way is for each of us to assume the leadership necessary to get the job done in our own back yard, and then, and only then, can we hope to solve the problems of industry as a whole.

BETTER UNDERSTANDING

will do more to solve the industry's problems than almost any other single factor, in the opinion of J. B. FRENCH, president of the Rocky Mountain Electrical League. Opportunity for establishing this understanding exists between the industry and its customers, management and the workers, the industry and the public. Without such understanding the industry's chances for survival in face of continuing attacks is remote

UNPRECEDENTED demand for additional electrical service and continuing shortage of materials and manpower along with many other necessary postwar adjustments has brought the electrical industry face to face with a host of difficult problems. Our industry is accustomed to solving difficult problems and I am sure it will solve the present ones. However, a combined and coordinated effort will be needed to solve them to the satisfaction of the public.

I have in mind particularly the high cost of facilities being added at this time. Just prior to the war we had made good headway in reducing the ratio between investment and annual revenue. The high-cost facilities presently being installed will reverse this trend and it will be important that the industry work together in bringing this situation to the attention of the public and the proper regulatory bodies.

I am sure this problem has caused a considerable amount of concern among the engineers and executives of the industry. I am also sure that the majority of them have reached the conclusion that, regardless of cost, the industry is obligated to provide the capacity necessary to supply the electrical needs of the communities they serve, and to do it as quickly as possible. It took a lot of intestinal fortitude to make this decision in the face of the extra effort and money required for construction work under present conditions and it would be easy to become so involved in the details of this work that we overlook the importance of keeping the public and the regulatory bodies advised of the necessity for it.

The proper presentation of this problem to the public and to the regulatory bodies is important. I hope the industry will give it the attention it deserves and will work together in pre-

paring plans for a successful presentation.

Last year, L. R. Storey, vice-president and general manager of the Home Gas and Electric Co. of Greeley, Colo., then president of the Rocky Mountain Electrical League, emphasized the need for the development of the industry's human relationships, and I can think of no better message to the industry than to give it in his own words.

"This seems to be the time," he declared, "when human relationships should be of great concern to each of us."

As it was true then, I believe it is more true today, for the year ending has only intensified its meaning.

"With world affairs strained to the breaking point, and with everyone on the verge of a case of nerves," Mr. Storey said wisely, "why not appraise each of our companies' attitudes toward the public? After all, the industry as a whole will have no better public relations than the individual companies which go to make up this great industry of which we are all a part.

"Fundamentally then, isn't the question, 'What of *our* company? Do our fellow employees have the correct perspective? If not, wherein lies the fault?'

"If the employees, who, after all, are the company, have the proper attitude, with the public's interest uppermost in their minds, we have laid a firm foundation for the industry's future welfare, which will make us stand out as a compliment to the ideals of service about which we talk so much. I think we often waste much time and money on what we love to call our 'public relations departments,' when after all, the only public relations which really count are the reflection of management's attitudes in the employees, which in turn creates the public's opinion of us.

"Why not more advisory departments, giving engineering help to our communities, acquainting our customers with the proper use of our facilities, and having home service departments to improve the standard of living in the homes? In other word, we have a wonderful opportunity to be of real help and make valuable contacts and friends. How and where are our customers to go for sound help and information on proper use of our product, if we fail them? Why not all of us take advantage of this opportunity not to sell, but to see that the full advantage is taken of our services.

"Why not really take the individual employee into our confidence and try to explain in simple language our aims and ambitions? Why not face the fact that each employee is reflecting to the public exactly what he sees in management? Why not let each feel that he can make a friend by doing often the little thing which means so much to the customer without being criticized by some over-zealous minor official?

"If a customer asks some special favor, unless the employee can give a good logical reason which will be readily understandable for not so doing, then I say, do it! Give to each employee the responsibility of making decisions as far as his capabilities will allow. Let's get away from so many rules and regulations, and substitute just good human judgment, let's make ours the one industry to substitute good solid reasoning for rules!

"I am quite sure our employees will rise to the occasion if given an opportunity. We are, after all, pretty much alike. If given responsibility, we must, in order to live with ourselves, try to meet it. Thus, let all the people in our company know the answers. If we cannot do certain things which we are asked to do, let's have *the* reason, not *a* reason for not doing so, and make it so clear that our friends will understand.

"Let's rid our business of all the mystery. After all, we have something to offer to make life more livable, something for which we need never apologize. We should be proud to have a part in an industry which offers so much to humanity. What would happen if each employee knew as much about our business as we do? What if our customers knew some of the difficulties we have in meeting their requirements? Why not tell them in a language they will understand?

"Why not let each employee know of the importance of political interference, and the difficulties of obtaining necessary equipment? Let them explain to our consumers why it is necessary to do this or do without that. When each employee realizes and feels that *he is the company,* we will have what we like to call good public relations.

"I am sure we have all been doing all of these things, but now as never before, it seems we should strive to better inform our entire personnel as there is so much misinformation being put out by so many who do not believe in our way of life."

And like him, let me ask this same question! Why not all rededicate ourselves to this one thing—better understanding by *us* of our customers, and in turn, a better understanding of our problems by employees, our regulatory bodies and public alike.

Modernization of street lighting in Canyon, Colo., typifies community effort. Southern Colorado Power Co. replaced single-lamp, 2,500-lumen, 12-ft. standards with 400-watt mercury on 27-ft. poles to increase useful light ten times

EACH DAY IS A NEW DAY

and with it comes new problems and new complexities, says JAMES H. POLHEMUS, president of the Northwest Electric Light & Power Assn. To be alive to the changes in the national and local economy and to be in step with them is the industry's major responsibility, according to him. He asserts that if any branch of the industry becomes static or complacent, its days are numbered and its competition has won the battle

OUR industry seems destined ever to be meeting new problems created by the shifting sands of our dynamic and fluid American economy. We have come, in a short time, from an enervating depression through a titanic war to a reconversion period full of surprises and uncertainties, so that at no moment could it be said our situation had become static. Thus, a year after our last report in these pages, we find ourselves tackling many problems that then were non-existent or were merely throwing a dim shadow in our direction.

This situation is reflected in our association, which we find adjusting its program to the needs of the new day. Examples are: the attention given by the engineers to the possibility of a critical power situation this coming fall and winter; the emphasis of our personnel people on job evaluation and merit rating and re-emphasis on accident prevention and employee training; the Agricultural Clinic, sponsored by our Business Development Section, devoted solely to promoting a more prosperous agriculture; and the provision for demonstration of new accounting machines at our Accounting Section meeting. These preoccupations all reflect an aliveness to some aspect of our national or local economy that was not present a year ago.

Building on the vigorous and forward-looking administration given to it by Patrick Johnson, last year's president, the association finds itself functioning more efficiently and in greater usefulness. The planning done in the later war years and in the early months of peace is now bearing fruit and all the section meetings are well and enthusiastically attended because of the well-organized programs. The first of these held this year was that of the engineers and operating men who went into a variety of operating problems, designed to conserve short materials and equipment, and at the same time expand for the ever increasing service sought by our customers. Ways of conserving load or increasing capacity in case a critically dry year causes a power shortage this fall and winter, were fully explored.

The next group to get together this spring was the Personnel group, which, following the lines laid down at the fall planning meeting, produced studies and laid the foundation for future recommendations in the multifold relationships of employer and employee. An innovation at the spring meeting this year was giving over an entire day to the safety directors for complete discussion of accident prevention and safety programs within the several companies, with the view to suggesting ways to strengthen all these programs.

Next to be heard from was our Business Development Section. Here again, as last year, the program was designed to attract our manufacturer, distributor, dealer and contractor associates, into an all-industry forum wherein the interrelationships of each group could be explored and brought forward as a coordinating influence. After all, in spite of the shortage of equipment with which to distribute power to our ever increasing number of customers, and the possible shortage of capacity with which to supply their ever growing demands, it is essential to our economy in this region that our industry be kept in the vanguard of economic progress, and this function lies very largely in the hands of our sales people. Although some of these sales groups are stymied at the moment by a combination of economic and political factors, there is much work for them to do, and a necessity for them to keep a balanced outlook toward the future. The program of this section meeting in Seattle was designed for the purpose of stimulation and inspiration, and the enthusiasm with which it was received by the largest number ever to attend an association section meeting attests to its success, and promises well for the long-range future of the electric industry.

The Accounting & Business Practice Section, the last of our four sections to meet this spring, will take cognizance of the economies to be made by the introduction of new accounting machines, having invited leading manufacturers of these machines to their conference at Salt Lake to display and demonstrate. This is a happy innovation for this group's meeting, into which it is always difficult to introduce novelty. Much of the equipment to be shown is "hot off the griddle," and the preview our accountants get will undoubtedly result in improved accounting operation for many of our companies in the future.

At the end of March, the association's new Research Advisory Service completed a year's operation. Through this service, which was purchased from Lt. Col. Bert H. White of Buffalo, its originator and owner, eight utility companies in Washington, Oregon, Idaho, Montana and British Columbia, offer their industrial customers advice on solving problems of production, processing and marketing. Some of the answers requested by inquiring customers can be found in the library of already solved problems purchased with the service; others not so covered are sent out to several laboratories, or other sources of information on file as cooperators in the service, for solutions. A recapitulation of the first year's use of this service made by the eight utility companies showed that nearly 600 library reports were sought by their customers, while somewhat more than 100 original problems were posed and put in line for solution. After a period required to get its feet on the ground, so to speak, in this new operation, the association geared up its director's office to take care of a yearly quota of about 1,500 reports.

The association executive committee again considered resuming the holding of an annual convention, a practice discontinued some years ago. It was

decided, however, that the time is not yet right for setting up such a meeting. The congested condition of all the Northwest cities, along with other unfavorable factors, was largely responsible for this decision. The usual annual business meeting of company members will, however, be held in Vancouver, B. C., late in June, and association officials look forward to being able to report a year characterized by unusually progressive activities. Because I will not have the pleasure of meeting a large number of my associates in person, such as would be possible at a large general convention, I take this opportunity to thank the section chairmen and their committees and helpers for the constructive work they have done for all of us during the past year.

WHY THE WEST EXPANDS

is analyzed in terms of basic characteristics of the American economy by F. T. LETCHFIELD, consulting engineer and assistant vice-president of the Wells Fargo Bank & Union Trust Co. of San Francisco. Isolation, he points out, deterred industrialization of the West. Now the West has communications, population, market and an immediate future

TO appraise the industrial growth of the West it is first necessary to recognize that it is the resultant of powerful, deep-seated economic forces which have been at work since colonial days. Due weight must also be given to the influence exerted by scientific discoveries, advances in engineering and the social and political developments of society in general. In short, the growth of human knowledge which, in the last analysis, is the most potent factor of all.

Second, it is desirable that we define what we mean by industry. Though it has no standing in the dictionary, we are usually referring, when we speak of industry in discussions such as these, to the conversion of raw materials into finished products or semi-manufactures.

From its inception the outstanding characteristics of American industry have been initiative, imagination, ingenuity, a contempt for tradition and a restless energy manifesting itself in a continuous search for better products and more efficient methods.

The characteristics were born of the conditions faced by the earliest settlers to our shores. Summers were hot, winters bitterly cold, forests stubborn, the soil was rocky and none too fertile. Tools were simple. The nearest base of supply was distant by weeks of perilous sailing. The pioneers were subject to a remote, indifferent, oft-times hostile government. All the circumstances of life were hard. Yet they survived, and in time they prospered, but it required courage and ingenuity of the highest order.

The same qualities of character were needed and displayed by all who occupied the frontier during the 200 years when it was being rolled westward. It was inevitable, therefore, that America should become a nation of mechanics, where even young boys displayed both ability and originality as craftsmen. The ever present necessity to solve physical problems with the materials at hand tended to inhibit reverence for traditional methods. Stimulating the same national psychology was the freedom of each youth to choose his own career. He was not bound by custom nor coerced by feudal concepts of society into following in the footsteps of his father—a universal practice in the old world of that day and one which still persists to a surprising degree. As a result, new blood, new ideas and new enthusiasms have poured constantly into American industry to keep it virile with the restlessness and eagerness of youth.

From time to time throughout all history forces of various nature have changed the course and character of societies and nations. Several such have molded and accelerated industry in America. I shall endeavor to discuss only three of these which have had a particular bearing upon the industrial development of the West.

The first is just now beginning to manifest itself decisively. I refer to the so-called long-haul theory under which our economy has operated ever since the eighteenth century. Natural selective processes made it inevitable that the South be settled by landed gentry and others who devoted their talents and energies to the growing of cotton, tobacco and other products suitable to the soils and climate of that area, and that New England—with its poorer land, its timber, iron ore and more turbulent streams providing water power—should attract the Winthrops, the Reveres, the shipwrights, the whalers, fishermen and seafarers in general. Thus the valleys of the Charles, the Connecticut and Naugituck became the cradle of manufacturing and shipbuilding in America. Settlement of the Ohio Valley and the exploitation of its coal extended our manufacturing areas, but as late as 1850 it was but a short distance westward in relation to our national boundaries.

Thus it was that we developed a system based upon the long haul of raw materials to the relatively small area within which our principal manufacturing was confined and from which in turn was required a long haul of finished goods to points of distribution. Jobbing and wholesaling were necessary auxiliaries, and so long as densities of population in America retained a virtual straight-line, but inverse relationship to distances from the Atlantic Seaboard, the system was efficient, or at least the best we could devise. But a mechanism designed to serve fifty or even seventy-five million people, at a time when a large percentage of our total area was thinly populated has been completely out-

Talk given by Mr. F. T. Letchfield, consulting engineer and assistant vice-president of the Wells Fargo Bank & Union Trust Co. of San Francisco, before the Fifth Western Metal Congress and Western Metal Exposition, March 24, 1947, in Oakland, California.

moded by a population of 140 million that is well distributed and served by highly integrated transportation systems. Herein lies a factor of first importance to the West.

Another force which must be carefully gaged as to its effect upon Western industry is represented by the requisites for efficient mass production, which is so peculiarly American.

The requirements for successful mass production are first, mechanization, second, control of quality to insure interchangeability of parts produced, third, a market sufficient to absorb an output large enough to amortize the cost well within the life of the equipment and, fourth, a continuous search for better equipment, more efficient operation or superior products and safeguards against the hazards of obsolescence.

Though our whole national economy has been stimulated incalculably by our adoption and perfection of mass production methods, the latter, paradoxically enough, have—until recently—tended to suppress industrial growth in the West. The reasons are quite obvious. The more efficient become the production techniques in any particular line of manufacture, the larger must be the market to absorb a minimum output at a profit. In other words, to oversimplify the situation, it has been something of a race between advances in mass production methods and growth of population in the West.

The most impressive feature of the West is its size. If that area lying between the Continental Divide and the Pacific Ocean were superimposed upon the eastern United States it would reach from Portland, Maine, to Jacksonville, Florida, and from Long Island to west of Kansas City, Kansas. The California coastline alone is virtually as long as from Chicago to New Orleans. Compared to European countries, France would hardly fill Nevada, while England, Ireland, Wales and Scotland could be put in California with room to spare for another England, and San Bernardino County of the same state could accommodate the whole of Switzerland with 6,000 square miles left over.

Having material bearing upon its industry is the wide geophysical and topographical diversity of the West. High mountain ranges are not conducive to low transportation cost or the speedy interchange of goods, but they do tend to make hydroelectric power cheaper and more abundant. The varied terraces of mountains, deserts and fertile plains combine to furnish metallics and non-metallic ores, rare earths, petroleum, natural gas and coal, mineralized waters and old lake beds rich in chemical salts, timber for pulp-wood and lumber, agricultural, horticultural and animal products of all kinds, supplemented by those of the sea. The list of industries which cannot find suitable raw materials in quantity and of proper quality somewhere in the West is very short.

In the last analysis, however, the controlling factor in the industrial development of any area is the population it contains, modified in each instance by the pattern of its distribution. This is the facet of Western industry which requires special consideration for, though we now have upwards of 20 million people, it must be remembered they are of about the same number, and occupy approximately the same area as the United States of a hundred and twenty-five years ago. It is only our modern means of transportation which makes possible an industrial integration of the West. More people live within a hundred and fifty mile radius of New York than in the twelve Western states. Los Angeles and San Francisco are farther apart than Philadelphia and Pittsburgh. Naturally, then, manufacturing in the West to date has been largely geared to local consumption or the cost of shipping from eastern or mid-western points or both; especially is this true of commodities having a low value per unit of weight. This, of course, does not include those categories involving the processing of raw materials indigenous to the West as exemplified in the food packing industries.

The manufacture of articles having a low value-high weight ratio will continue to give Western industry its greatest impetus especially now that basic iron and steel semi-manufactures will be available at substantial savings to the fabricator from Geneva and presumably from Fontana. This is not, however, the whole story by any means for there is every evidence that the West is rapidly becoming a major production area of high value commodities for national markets, to say nothing of exports.

Now and then in history particular events serve either to depress the economic development of a given country or greatly to accelerate it. World War I was of the latter category in its effect upon America. It transformed us from a debtor nation to the world's creditor, it reversed our role from an importer of manufactures and exporter of raw materials and it served to hasten the integration of our industry by several decades. In like manner World War II had a catalytic effect upon the economy of the West. Its influence upon the Pacific slope was quite different than that of the first World War. During the latter, the Western states furnished manpower and raw materials but participated very little in the actual manufacture of war goods. Direct expenditures by the government in the form of war contracts did not exceed a billion dollars. The effects of World War II were markedly different.

In the first place, World War II was truly global and the Pacific Coast had to be the base of operations for the whole Pacific theater. Second, the industrial development of the West, resulting in part from its growth in population during the twenty-four years between wars, provided a foundation wide enough to accommodate both the expansion of existing manufacturing facilities and the addition of activities wholly new to this area. Ballooning of the Coast's aviation industry is an example of the former and the manufacture of shells, guns, tanks, torpedo mounts, etc. illustrates the latter.

This had four major effects which today are manifesting themselves in critical fashion—and will continue to do so for a long time to come. There was an immediate immigration of workmen and their families in large numbers, with no net loss—in fact a continuation of the movement—after V-J day. There was the expenditure by the government—exclusive of the payments to military personnel—of 30 billion dollars within the twelve western states. There was construction and complete equipping of hundreds of plants with the last word in tools, machines and processes. In other words, as Western manufacturing stands today, obsolescence is almost non-existent and a preponderant percentage of war-created facilities is suited equally well for the production of peacetime goods. More important, however, is the know-how acquired by Western managements in lines never before attempted this side of the Mississippi.

To illustrate: rockets involved physical chemistry, metallurgy, ballistics, pure mathematics, ultra-high-speed photography, physics and top flight production know-how. Some of the most difficult and stubborn problems of radar were not electronic but mechanical. Every field of science and engineering made important contributions. It sounds extravagant, but the assumption is warranted, that in many respects we have learned more of nature's deepest secrets during the past six years than in all previous time since man first walked the earth. The atomic bomb is a case in point.

Of particular significance to the West is the promise scientific progress, born of war, holds for improvements in the young art of geophysics. It is not only interesting but sorely needed, for the old-time prospector and his burrow have all but vanished from the

deserts and mountains of the West. Of late years prospecting has been confined to the areas reached by roads in an automobile or the perusal of old mining reports. By techniques similar to those we perfected for anti-submarine warfare, it may be possible to determine and map not only the surface but the subterranean geology of every square mile which offers promise. One has only to study the statistics of what the war did to our underground reserves of lead, zinc, copper, iron, non-metallics and petroleum to appreciate the need for a complete and accurate geological survey of what we have left.

It has long been my conviction that one of the secrets of America's industrial success lies in the avidity with which American engineers adopt the discoveries of science and put them to practical everyday use. Another is the liaison between engineers and scientists which in many respects is unique to this country. You will find exactly the opposite in most other parts of the world. It is made possible by the free and complete exchange of information between all professions in America. An exchange which should be vastly more effective from now on as a result of our technical mobilization for war and the lessons it taught.

It follows then, as night the day, that industry will utilize our new-found wealth in scientific discoveries and engineering developments to bring forth new products, perfect techniques, improve processess and enlarge production, all to the end of providing the public better things at lower prices. Currently there is little evidence of such a movement for we have been engrossed in reconverting from war to peace, in restocking shelves with daily necessities. But once the present sellers' market ends—as end it will—when the forces of competition begin to manifest themselves, then you may be sure that the same qualities of initiative, imagination and intelligent enterprize which conquered the wilderness of New England and spanned a continent with a railroad, will be exerted by industrialists of today.

Little of the actual scientific knowledge invoked in each case will appear to the naked eye any more than the engineering skill which goes into an automobile is apparent to or appreciated by the average driver. But the great strides in both science and engineering engendered by the war will nevertheless influence all industry profoundly, including new additions.

A great array of new developments holds out economic opportunities. Look about you at home where you live, on the streets and highways you travel, in the fields, the factories or the offices where you work. Everywhere you will see things which must be done to rehabilitate our whole physical plant. Could we measure these physical deficits in their entirety they would represent a job of far greater proportions than the task we faced the day of Pearl Harbor, huge as that was.

Why is this so? For three reasons. First, because we have never recovered from the depression detonated by the stock market crash in 1929. We steadily retrogressed economically all through the decade of the thirties. Second, the war destroyed more of our resources than our entire national wealth was computed to have been in 1929, and the third reason is that Americans have never been content with a static standard of living. They have ceaselessly striven to raise it. But a standard of living for a nation can only be raised by increasing the amount of wealth produced by its people. The fact that we have endeavored to evade this axiom in the conduct of our national affairs for the past fifteen years in no way lessens its immutability. It has merely enlarged the job before us.

I began this discussion with a discourse on American industry in general and am concluding it in the same vein. Why? Because the West is no longer an outland colony, no longer a young, partially baked, economic empire isolated by the Continental Divide but a component part of the nation's economic structure and must be appraised as such. True, we Westerners may be proud of our industrial machine and its accomplishments. We may look forward with every confidence to the future. But Westerners—like their industry—are first of all, American.

The Kaiser Fontana Plant

RURAL PROSPERITY PAYS

Potency of the self-interest philosophy is just as great today as it was years ago, and when applied to a basically rural community, it can pay dividends to the power company. That is the fundamental reasoning behind the agricultural development program of Portland General Electric Co. According to FRANK G. MACKANESS, company's agricultural consultant, experience with program proves soundness of the philosophy

THERE could be as many different theories about what an electric utility can do about agricultural development as there are companies, and all of them could be good. Almost any system is good if it works. So this particular discussion in no sense should be construed as advocacy of a broader use of the theory and practice followed by PGE.

In our theory and its application we start with the basic reasons for existence—to do a job and to make money. We use these guideposts throughout and never back off and apologize for them, pretend high-minded altruism or other humbug. From here we reason roughly:

(1) That all societies follow an evolutionary pattern and power companies are no exception (the idea implicit in this is that our approach should never remain static or hidebound but should change and develop in concert with our environment); (2) that the prosperity of a power company can never be much greater proportionately than that of the community it serves and is likely to reflect in its balance sheet the vissicitudes of the community; and (3) that the prosperity of the community depends in the final analysis upon its prime producers of wealth rather than its service trades.

From these premises it is a short step to reach the conclusion that the way to self-help for a utility serving practically everybody lies through community prosperity for which the prime producers are responsible.

The most support therefore should go to those who produce most. In some communities this might well mean the miners or the fishermen. In our own lower Willamette Valley it means supporting those connected with agricultural production and processing.

The kind of help a power company has traditionally offered has been electrical. Dividends from this aid have logically been collected directly from farmers in heavier loads. This was sound reasoning and an excellent policy, but with a wider concept of wealth it is no longer necessary to measure the company's benefits in terms of rural load.

Prosperity which starts at the farm spreads to every corner of the community like ripples on a pond. Because utilities serve almost everybody, they need not expect to collect the price of the pebble they threw from only the first ripple. In some instances it is poor business to do so, for while farm prosperity is generally raised by the use of electricity, it is not contingent upon it.

Our aim may be summarized then as agricultural prosperity. This goal is the target of as many people as heaven and they approach it by as many roads.

Our own approach is naturally influenced by our profound belief in private enterprise. Critics sometimes suggest that we could invest our few dollars to better effect by spending them through established agencies. Monopolies in religion and education soon change, subtly or blatantly, from offering you something to telling you something. We fight shy of this. We like the way things are, and we get on wonderfully well with the innumerable people working toward the same ends.

Our agricultural program is divided into two parts operating directly under the general division manager.

One part concerns itself with assuring the farmer of proper electric service, devices which use electric power and service on these devices. Except in special cases no direct service is given on farm equipment by company men. The company employees tackle the problem by educating dealers and distributors in making appropriate appliances available to the farmer and giving service on these goods after sale. Thus the effect of one company man is multiplied by almost as many times as the dealers he works with.

The other part consists of a trained farmer who has been caught and tamed a bit. Right now I am in this position, but whoever holds it is available to any customer or member of the company and has an answer for some of the questions raised and knows where to go for most of the others. As far as possible he keeps abreast of what is going on in his field, nationally and locally, digesting the mass of material that comes out so that customers can be referred to up-to-the-minute sources on special subjects.

Liaison work is considerable. With the many community committees on this and that there are innumerable occasions when the company's problems must be interpreted to the farmer and the farmer's problems interpreted to the company. Familiarity with the language of both groups is important.

Better farming methods are demonstrated on customers' farms scattered through the region served and these infections spread quite encouragingly.

Special problems which need more than ordinary work and study come in occasionally. If they are of importance to a whole district, if no one else is working on them and they are within our capacity, we will take them on. To quote the most recent, a county agent came with a complicated fertility problem on a drained peat bog. Given just ordinary luck the 700 acres involved will be producing 100 sacks more onions per acre in 1948 than in 1947.

Average inquiries run the gamut from the law regarding ground waters, proper pasture seed mixtures, photoperiodism in azaleas, irrgation, weed control, soil fertility and so on, to marketing rabbit meat. Nearly always there is some special aspect of the question which is not covered by bulletins or on which the customer feels he needs more enlightenment.

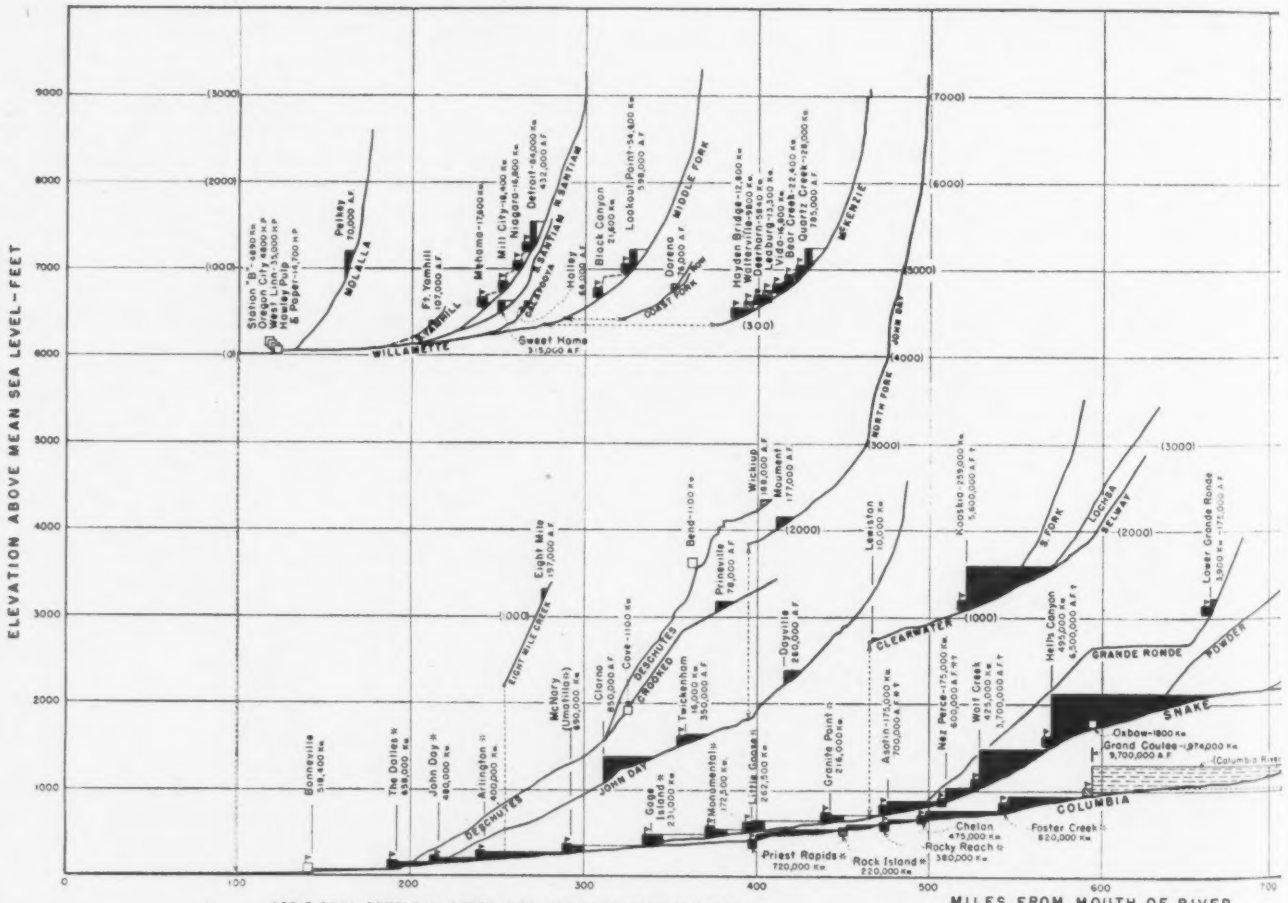
We feel that it contributes quite a little to the over-all prosperity to help these inquirers to solve their problems. And this brings us full circle back to where we started. In an integrated community when the prime producers prosper their utility can prosper.

POWER ON THE COLUMBIA

constitutes a major resource of the Northwest, a resource of such magnitude that its ultimate development can affect the economy of the entire West and even, significantly, the nation. From the Bureau of Reclamation's report to the Secretary of the Interior comes a detailed appraisal of Columbia River power, possible projects and their eventual effects

COMPREHENSIVE development of the water resources of the Columbia River Basin might ultimately entail 238 projects providing irrigation water for 5,360,000 acres of land and generating 55,600,000,000 kwh. of firm electric energy and 9,100,000,000 kwh. of secondary energy annually. Such a program is envisioned by the U. S. Bureau of Reclamation in a plan submitted to the Secretary of the Interior. Fulfillment would extend over several decades. Ultimate capital cost based on current price levels would total an estimated $5,598,494,000. This sum would consist of $4,008,704,000 for water resource development and $1,589,790,000 for the hydroelectric power transmission system.

The development as a whole is subdivided into two principal stages. Projects already authorized for construction by the USBR, the Office of Indian Affairs and the U. S. Army Engineers would comprise the initial stage. This entails 47 projects for the



ADDITIONAL POTENTIAL RESERVOIRS AND POWER DEVELOPMENTS

PROJECT	STREAM	RESERVOIR NAME	RESERVOIR CAPACITY AF	POWER PLANT NAME	POWER PLANT CAPACITY KW
Chullis	Salmon	—	—	Chullis	5,000
Columbia Basin	Off Stream	Grand Coulee Equalizing Reservoir	1,200,000	—	—
	Off Stream	Pot Holes	615,000	—	—
Grande Ronde	Catherine Creek	—	—	Catherine Creek	800
	Little Indian Creek	—	—	Little Indian Creek	2,100
Lemhi Valley	Salmon	—	—	Lower Lemhi	2,500

PROJECT	STREAM	RESERVOIR NAME	RESERVOIR CAPACITY AF	POWER PLANT NAME	POWER PLANT CAPACITY KW
Yakima	Off Stream	—	—	Roza	12,000
	Bumping	Bumping Lake	154,000	—	—
	Cle Elum	Lake Cle Elum	117,500	—	—
	Klickitat	Klickitat	135,000	—	—
	Klickitat Diversion	—	—	Upper Wapato	41,600
	Klickitat Diversion	—	—	Lower Wapato	25,000

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irrigation of 1,313,620 acres of new land; the provision of supplemental water to 1,077,980 acres now inadequately supplied and hydroelectric power installations with aggregate capacity of approximately 4,331,000 kw. In addition navigation improvement on the lower Columbia, Willamette and Snake Rivers and flood control in areas where great flood hazards now exist would be included. Some $1,843,330,000 would be required for construction of these 47 developments at current price levels.

Eleven new projects are incorporated in the first part of the second stage in the development program. The bureau is recommending that these initial projects now be authorized for construction by Congress. Only 177,000 kw. of hydroelectric power installations would be involved in the eleven projects.

This would leave 180 projects in the second stage of the development for which no recommended action is proposed. Ultimate cost of this latter group is estimated to be $3,575,592,000 at 1946 price levels. The bureau contemplates recommendations from time to time for authorization of some of the developments in this group.

The Great Basin

This program is enormous, but so is the basin which it is designed to develop. The Columbia River drains a basin of 259,000 sq. mi. About 15% of this is in British Columbia. The 85%, or about 220,000 sq. mi., which is within the United States, constitutes about 7% of the nation's area—a land mass somewhat larger than France and about twice the combined area of the British Isles.

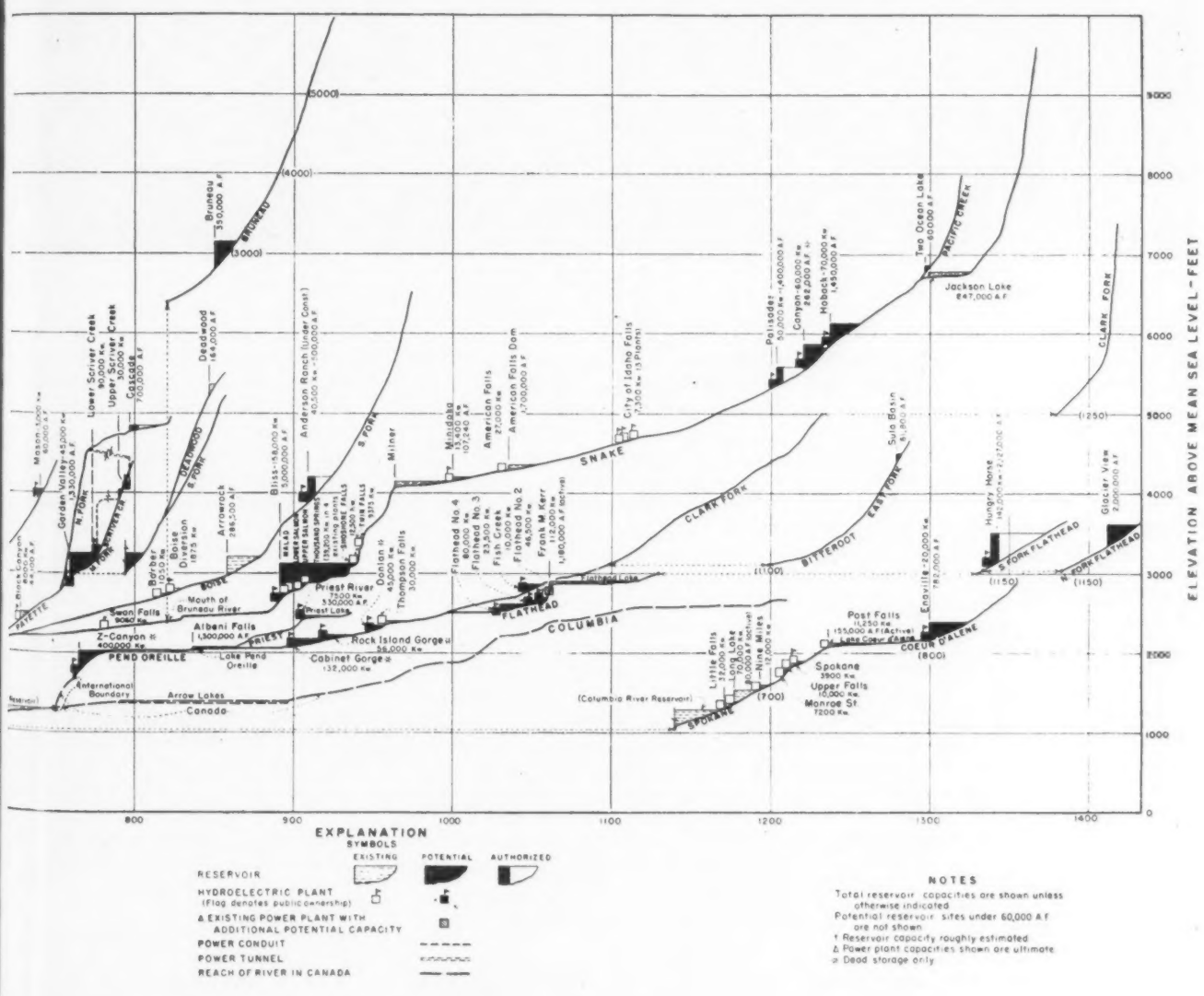
The basin includes nearly all of Idaho, most of Washington and Oregon, the western part of Montana, smaller areas in Wyoming and Nevada, and the northwestern tip of Utah. The Columbia River originates 2,650 ft. above sea level in British Columbia and flows for 465 miles before entering the United States. After winding through Washington in a series of big bends, it turns west, cuts through the Cascade Mountains, and upon completion of its 1,200-mile journey discharges an annual average of nearly 160,000,000 acre-ft. of water into the sea.

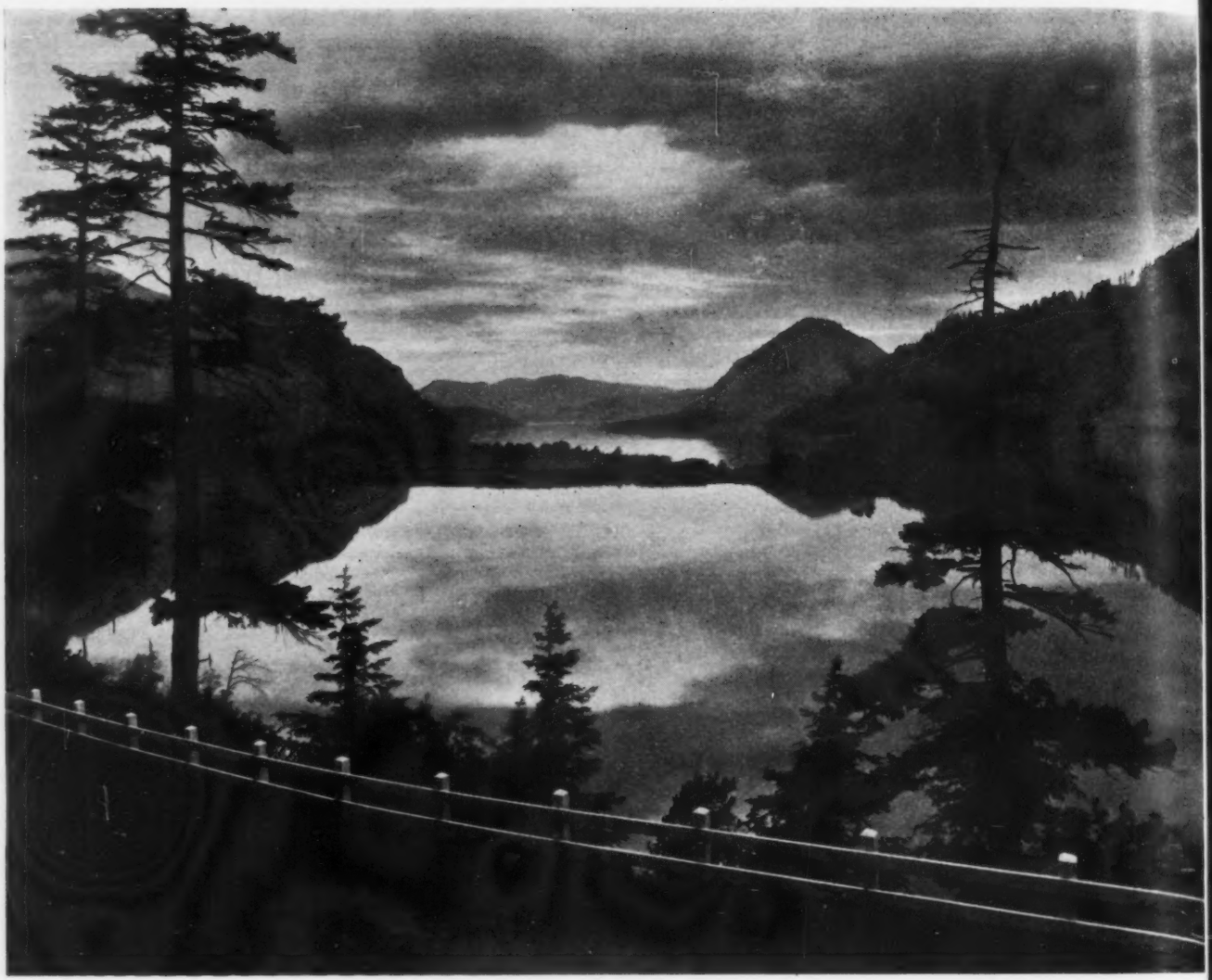
Playing the second major role in draining the basin is the 1,000-mile-long Snake River, which originates at an altitude of 10,000 ft. in western Wyoming, flows westward across southern Idaho, turns north through the mountains of central Idaho and northeastern Oregon, then turns west again to flow into the Columbia near the southern Washington boundary.

What Will Be Needed?

This then is the area with which the planning is concerned. Authorized projects connected with the first stage of development are shown in Table I. Subsequent projects appear in Table IV. The scheme of the over-all plan may be visualized from the profile illustration.

When it comes to estimating the potential demand for power, elements of





uncertainty creep in, which the bureau recognizes. There is, for example, the matter of rates. Low power rates will certainly increase usages, but no one appears ready to commit himself as to what those rates may be. Again, the mere presence of low-cost energy available on a scale which would be unmatched elsewhere in the nation, would undoubtdly constitute a special attraction to industries requiring a lot of power.

In connection with the latter, the wartime expansion of industries along the Columbia seems to indicate the effect which such availability can exert. Furthermore, postwar experience appears to show the permanent character of such effect, particularly in the case of the prompt reopening of the aluminum plants for peacetime production.

Further development of electrochemical and electrometallurgical industries is viewed as being of particular significance. Two general fields of opportunity are involved. One concerns the establishment of expansion of plants which can serve the growing Northwest market by competitively filling demands which formerly could be satisfied only by more distant sources of supply. The other depends on industrial innovations utilizing local materials and serving markets both local and distant.

Shapes made of fused basalt may prove to be an example of the latter. Basalt is the most abundant raw material in the Columbia Basin; fused basalt products have been used commercially in France since 1910, and in Germany and Russia for a decade.

Fused silica granules, made from quartz, for use in making refractories and ceramics, and fused forsterite, a refractory, are other possibilities. Some study has also been given to the production of ductile zirconium, made from Oregon Zircon, and to ductile titanium.

Forecasting Methods

Three different approaches have been made to the matter of predicting future energy requirements. These are: (1) The projection of past rates of load growth; (2) the projection of past increases in per capita consumption coupled with estimates of future population; (3) estimates of total loads 30 to 40 years from now summed up from separate estimates of individual load components. According to the bureau's figuring, each of these three methods indicates a regional power load on the order of 45 billion kwh. by 1980.

The projection by past rate of load growth takes the total power sales of public utilities in the states of Washington, Oregon and Idaho from 1926 to 1929, in which the increase was from 2.2 billion kwh. to 4.4 billion, or an annual 5.5% rate of increase. Ignoring the extra impetus of wartime expansion, this projection starts from the total amount of power used in the region during 1940 and arrives at 52.9 billion kwh. in 1980.

The per capita computation uses the same period and the same states in determining per capita increase, which was from 784 kwh. to 1,329 kwh., or

about 4.1% per year. The population estimate is as shown in Table II, which is an estimate by the Columbia Basin Joint Investigation and is intermediate between the high and low forecasts of qualified investigators. By this procedure, 43.1 billion kwh. for 1980 is arrived at. It should be noted that this ignores the development of special requirements, such as high-load industries, electric house heating and unforeseen usages.

The detailed consideration of each type of load involves a great variety of factors out of which separate estimates are made for each of nine types of load as shown in Table III.

Power developments contemplated in the report, together with present installations, would have an aggregate capacity in excess of the minimum load predicted for 30 to 40 years hence. The assumption is that potential installations would be made only as required by load growth, expanding as required from the present regional output on the order of 13 billion kwh. to a potential delivery of an additional 31.7 billion kwh. of firm power and 7.5 billion kwh. of secondary power, allowing a 7% system loss.

Estimates of Rates

In regard to cost the report has this to say: "The basic wholesale rate of the Bonneville Power Administration is $17.50 per kilowatt year, or 2.0 mills per kilowatt-hour, at 100% annual load factor. On the basis of this rate at 100% load factor, the rate at 70% annual load factor is 2.86 mills per kilowatt-hour, at 60% load factor is 3.34 mills, and at 50% load factor is 4.00 mills, but a special schedule for demands where low load factors are involved reduces the rates somewhat below those cited.

"In view of the fact that the Bonneville Power Administration rates prevail in the area where the larger part of the potential power developments lie, it is assumed that the average rate would range from 2.0 to 5.0 mills per kilowatt-hour. For the purpose of estimating the gross annual return from firm commercial power, an average rate of 2.7 mills is used."

On this basis the gross annual revenue from firm commercial power would amount to $139,792,000.

Secondary energy is expected to average about 1 mill, ranging from 0.5 to 2.5 mills per kilowatt-hour, thus bringing in $6,900,000.

While the outline of a general, long-range program can be set forth, the region is so large, the power potentialities so great, and the diversity of resources and interests so extensive that continual study, as the report points out, will be necessary as growth pro-

Table I—First Stage of Development—Authorized Projects—Columbia River Basin

Agency and Project or Unit	Active Storage Capacity (acre-ft.)	Installed Power Capacity (1,000 kw.)	Irrigation New Land (acres)	Irrigation Supplemental Water (acres)
DEPARTMENT OF THE INTERIOR				
Bureau of Reclamation				
Anderson Ranch Dam, Ida.[1]	500,000	40.5	0	290,000
Rathdrum Prairie Project, Ida. Wash., Post Falls Unit[2]	0	...	2,100	1,400
Palisades Dam, Ida.	1,276,000	30.0	0	650,000
Mann Creek Project, Ida.	7,000	...	270	4,030
Boise Project, Ida., Payette Division[1]	650,000	...	25,000	83,750
Arrowrock Dam, Ida. Flood Control Outlets	0	0	0	0
Missoula Valley Proj., Mont.[3]	0	...	900	1,200
Bitterroot Valley Project, Mont., Woodside Unit	0	...	0	18,600
Hungry Horse Dam, Mont.	1,700,000	142.0	0	0
Deschutes Project, Ore., North Unit[1]	0	...	50,000	0
Yakima Project, Wash., Roza Division[2]	0	12.0	56,450	0
Columbia Basin Proj., Wash.[3]	0	1,156.0	1,029,000	0
Equalizing Reservoir	700,000	...	...	...
Potholes Reservoir	350,000	...	...	0
WAR DEPARTMENT				
Series of dams on Lower Snake River[5]	0	882.0	0	0
McNary Dam, Ore.-Wash.	0	690.0	0	0
Lookout Point Dam, Ore.	433,000	54.4	0	0
Black Canyon Dam, Ore.	...	21.6	0	0
Quartz Creek Dam, Ore.	560,000	128.0	0	0
Detroit Dam, Ore.	322,000	84.0	0	0
Dorena Dam, Ore.	70,000	...	0	0
Sweet Home Dam, Ore.	310,000	...	0	0
Navigation Channel Improvements:				
Snake River[4]	...	...	...	...
Columbia River[4]	...	...	...	...
Willamette River[4]	...	...	...	...
Flood Control Channel Improvements:				
Willamette River and trib.[4]	...	...	...	...
Minor tributaries of the Columbia[5]	...	...	...	...
Snake River and trib.[6]	...	...	...	...
DEPARTMENT OF THE INTERIOR				
Office of Indian Affairs:[7]				
Michaud Flats Project, Ida.	0	...	22,000	0
Western Shoshone Ext., Nev.-Ida.	35,000	...	23,000	0
Flathead Valley Ext., Mont.	0	...	31,000	10,400
Hall Creek Project, Wash.	0	...	4,000	0
Nespelem River Proj., Wash.	8,000	...	4,000	0
Wapato Extension, Wash.	0	...	8,500	0
Klickitat Division, Wash.	172,000	66.6	28,000	15,700
Satus Unit No. 3, Wash.	0	...	7,500	0
Warm Springs Project, Ore.	0	...	6,500	0
TOTAL	7,093,000	3,307.1	1,298,568	1,078,510

[1] Under Construction.

A. On the Columbia Basin project, power figure represents increase over present capacity. Generators with a combined capacity representnig 982,000 kw. of that increase have been specifically authorized.

B. On the Missoula Valley project, only the Big Flat unit is under construction.

C. On the Roza division of the Yakima project, only irrigation works to supply water for 31,450 acres are now under construction. Moreover, the land already being irrigated on the Roza division is not included in the 56,450-acre figure shown in the table.

[2] Completed recently.

[3] A "series of dams" has been authorized on the lower Snake River.

[4] A "series of projects" having no storage, power, or irrigation features.

[5] Two projects having no storage, power, or irrigation features.

[6] Six projects having no storage, power, or irrigation features.

[7] Continuing program of irrigation development.

Table II—Estimated Future Population of Pacific Northwest

Year	Urban Number	Urban Per cent of total	Rural Number	Rural Per cent of total	Total
1940	1,682,157	49	1,768,520	51	3,450,667
1950	1,880,200	49	1,940,800	51	3,821,000
1960	2,164,700	50	2,183,300	50	4,348,000
1970	2,298,800	50	2,303,200	50	4,602,000
1980	2,405,900	50	2,394,100	50	4,800,000

Table III—Estimate of Loads by Type in Pacific Northwest, 1980

Type of Load	Million Kilowatt-hours
Urban Residential	3,880
Rural	3,234
Manufacturing	21,100
Mining	275
Transportation	1,400
Commercial	3,600
House Heating	5,220
Irrigation Pumping	3,600
Steam Generation	2,700
Total	45,009

Table IV—Potential Power Developments—Columbia River Basin

Power Plant	Stream	Avg. Head (ft.)	Installed Capacity (1000 kw.)	Annual Production[1] (million kwh.) Firm	Secondary	Annual Cost (1000 dollars) Operation & Maintenance	Provision for Replacement
Hungry Horse[2]	S. Fork Flathead	373	142.0	580	0	137.0	50.0
Kerr	Flathead	185	56.0[3]	392	0	77.0	29.0
Flathead No. 2	Flathead	51	46.5	245	0)	...	...
Flathead No. 3	Flathead	26	23.5	125	0)	215.0	111.0
Flathead No. 4	Flathead	88	80.0	418	0)	...	...
Priest River	Priest	120	7.5	49	10	24.0	7.0
Fish Creek	Clark Fork	100	10.0	70	19	29.0	8.0
Thompson Falls	Clark Fork	...	...	162[6]	0	...	...
Donlan	Clark Fork	40	45.0	246	50	71.0	42.0
Rock Island Gorge	Clark Fork	50	56.0	307	62	77.0	47.0
Cabinet Gorge	Clark Fork	107	132.0	700	121	127.0	58.0
Z Canyon	Pend Oreille	277	400.0	2,720	...	282.0	118.0
Enaville	Coeur d'Alene	180	20.0	...	126	44.0	13.0
Washington W.P. Co. (6 plants)	Spokane	...	...	319[6]	0	...	...
Roza[4]	Yakima-Roza Irrigation Canal	160	12.0	26	47	32.0	9.0
Anderson Ranch[2]	S. Fork Boise	260	40.5	...	118	80.0	21.2
Arrowrock	Boise	...	13.0	...	42	15.0	8.4
Upper Scriver Creek	Payette	390	30.0	208	...)	217.0	68.0
Lower Scriver Creek	Payette	770	90.0	411	...)	...	...
Garden Valey	Payette	280	45.0	...	135	81.0	22.0
Mason	Powder	120	3.0	...	6	10.0	5.0
Challis	Salmon	200	5.0	15	10	35.6	7.4
Lower Lemhi	Salmon	75	2.5	11	...	28.0	7.3
Catherine Creek	Catherine Creek	110	0.8	1	2	8.0	1.0
Little Indian Creek	Little Indian Cr.	616	2.1)	...	...	...	...
		550	0.6)	3	6	20.0	1.6
Lower Grande Ronde	Grande Ronde	136	3.9	3	9	19.0	4.0
Kooskia	Clearwater	456	259.0	1,700	...	209.0	81.0
Hoback	Snake	256	40.0	180	...	75.0	21.0
Canyon	Snake	275	70.0	310	...	99.0	33.0
Palisades[2]	Snake	181	30.0	131	99	59.0	17.4
Bliss	Snake	473	158.0	940	...	161.0	58.0
Hell's Canyon	Snake	533	495.0	3,033[5]	...	372.0	178.0
Wolf Creek	Snake	436	425.0	2,610	...	345.0	153.0
Nez Perce	Snake	140	175.0	1,070	...	176.0	84.0
Asotin	Snake	138	175.0	1,070	...	176.0	84.0
Granite Point	Snake	83	216.0	955	33	164.0	118.4
Little Goose	Snake	112	262.5	1,280	44	199.0	125.4
Monumental	Snake	75	172.5	866	28	148.0	97.9
Gage Island	Snake	105	231.0	1,211	41	175.0	112.7
Upper Wapato)	Klickitat	(1000	41.6)	...	...	(68.0	16.3
Lower Wapato)	Division	(613	25.0)	84	186	(52.0	11.1
Quartz Creek[2]	McKenzie	223	128.0	328	126	123.0	49.6
Bear Creek	McKenzie	112	22.4	165	18	49.0	15.3
Vida	McKenzie	85	16.8	126	13	40.0	13.2
Leaburg	McKenzie	88	7.3[3]	48	12	24.0	6.8
Deerhorn	McKenzie	35	5.8	43	5	21.0	8.
Walterville	McKenzie	52	7.2	52	7	23.0	9.1
Hayden Bridge	McKenzie	80	12.8	93	12	34.0	10.7
Detroit[2]	North Santiam	274	84.0	227	75	98.0	30.5
Niagara	North Santiam	176	16.8	130	14	40.0	10.0
Mill City	North Santiam	194	18.4	143	15	44.0	10.5
Mehama	North Santiam	182	17.6	134	14	42.0	10.3
Lookout Point[2]	Willamette	216	54.4	196	87	77.0	22.8
Black Canyon	Willamette	199	21.6	162	20	48.0	12.1
Willamette Falls Plants	Willamette	...	...	23[5]	...	...	...
Grand Coulee	Columbia	330	1,156.0[3]	3,460	3,440	1,271.0	851.0
Foster Creek	Columbia	162	1,024.0	4,950	1,054	672.0	417.0
Chelan	Columbia	90	475.0	2,750	610	310.0	252.0
Rocky Reach	Columbia	55	380.0	1,680	390	287.0	248.0
Rock Island	Columbia	48	160.0[3]	1,070	...	138.0	103.0
Priest Rapids	Columbia	131	720.0	4,270	936	439.0	325.0
McNary (Umatilla Rapids)	Columbia	82	690.0	3,914	568	450.0	318.0
Arlington	Columbia	48	400.0	2,290	322	270.0	190.0
John Day	Columbia	59	480.0	2,850	362	323.0	237.0
The Dalles	Columbia	76	658.0	3,800	522	430.0	297.0
Bonneville	Columbia	...	...	918[6]	...	...	...
Total		...	10,598.6	56,273	9,816	9,359.6	5,276.3

[1] The data represent the total output of firm and secondary energy which would result from potential developments.

Of the total firm energy shown, 601 million kilowatt-hours would be required to replace the output of existing plants (1) which would be flooded by potential storage reservoirs and (2) at which output would be reduced by conservation of water for irrigation. Hence, the net increase in firm energy output resulting from the potential development would be 55,672 million kilowatt-hours annually.

Stream regulation achieved by the operation of upstream storage would result in the conversion of secondary power to firm power at a number of existing plants. The result would be to decrease the output of secondary energy at existing plants by 621 million kilowatt-hours. Hence, the net increase in output of secondary energy resulting from the potential developments would be 9,195 million kilowatt-hours annually.

[2] Authorized project.

[3] Additional generator installation at existing power plant.

[4] Present works were constructed to accommodate power installation.

[5] Salable energy after deduction for replacement of energy destroyed at existing power plants.

[6] Increase due to storage releases.

ceeds. While it is possible to measure the typical potentials, insofar as hydroelectric energy is concerned, the question of developing this resource at any given time is related to its intended use. This immediately raises questions concerning virtually every aspect of a regional economy ranging through questions relating to Indian land, details of irrigation, effect on forest resources, grazing land, and so on. Furthermore, much is yet to be learned concerning the general resources of the area, and who can predict the innovations which may appear in established industries vitally affecting their power relationships?

Along with these considerations goes the fact that a large number of alternative power possibilities appear in the picture.

The evolving character of the foregoing makes it apparent that power potentialities, markets and transmission must be continuously studied if development is to be economical and properly timed. The same sort of study is contemplated in connection with closer determinations of water resources and engineering considerations with reference to various sites. In nearly every case, a particular site is related to other sites, since all are using the same water, and it is their operation in combination which determines their final performance.

In this regard, the bureau points to the particular importance of the large main stem power plants as they are affected by the additional storage of water at the upper Columbia.

As examples of specific fields for study, out of which may be drawn some more definite indications of the region's future power market, the following are listed:

1. Estimates of the way in which significantly different groups of power users may be expected to expand.
2. More detailed analysis of consumption trends of various classes of users.
3. Further study of the relations between rates and usages.
4. Estimates of probable trends in rates to consumers.
5. Study of residential and commercial heating.
6. Study of probable trends in appliance sales and usage.
7. Analysis of potential irrigation pumping loads, both for large projects and individual farms.
8. Study of farm electrification trends in general.
9. Estimates of trends in street and highway lighting.
10. Analysis of the probable extent of further railroad electrification in the region.

Added to these would be the estimated effects of industrial expansions and innovations, as indicated by the results of the previously mentioned industrial investigations.

The bureau contemplates the direction of such studies toward a comprehensive, long-range plan for power development and its adjustment to the prospective power market and projected development of the region. It is on the basis of such studies that the scheduling of future developments will take place.

MORE LEFTIST THUNDER

is being put behind efforts to keep the fast growing co-ops from being subjected to same rules and same income taxes as business in general. As tax-free co-op sales soar toward $25,000,000,000 per year Congress is studying their tax evasion tactics. And as these studies proceed the evident aim of some co-op backers to create a non-profit socialistic system in America becomes clearer. It's time for business to speak up

FEDERAL Ways and Means Committee hearings on the income-tax-dodging status of various kinds of businesses, and the effects of their exemption on our competitive economy, may be under way in Washington by the time this issue of ELECTRICAL WEST appears. If not, they'll be coming up soon, for the committee has scheduled this long-needed investigation to follow hearings on excise-tax revision. It will carry on, if need be, into the summer recess of Congress.

It looks as if Congress means business. As one of the Capital's top-ranking tax experts put it not long ago: "With a heavy cut in income-tax rates, we've now got to close all the existing loopholes in the law and in Treasury regulations in order to be sure that we collect enough money to run the government."

The hearings will cover a broad canvas—labor unions, which are engaging in many commercial activities without paying income tax on earnings; educational institutions and charitable foundations, which have recently been buying or acquiring by inheritance a lot of factories and other income-producing properties which are thereby automatically exempted from further payment of federal tax; perhaps government corporations in the electrical field, in fertilizer manufacture, in transportation, shipping and other activities; and cooperatives of all varieties, both farm and city owned, which have expanded to a more than $12 billion annual volume and are presenting an increasingly serious menace to tax-paying private enterprise.

Two years ago, when ELECTRICAL WEST published its first story about the co-op threat, there was plenty to wonder and worry about. Even then the co-ops had captured control of many important industries, and various leftish leaders had stated and restated their aims to substitute a so-called cooperative democracy for our established political state.

At that time, however, the electrical industry knew the co-ops more by reputation than by direct competition. True, the REA cooperatives were distributing electric energy to hundreds of thousands of farmers, but the theatened co-op invasion of the appliance business was still only talk.

Today, words have given way to action. While the REA's are consolidating their gains and stretching their lines into more corners of the country, thousands of other small, local retailing cooperatives are advertising and selling an almost-full line of co-op branded appliances.

And meanwhile other co-ops, operating at the manufacturing and wholesale levels and getting away with an income-tax exemption for which the law gives no authority, are moving steadily ahead with plans that plainly aim at monopoly.

Time was when co-op leaders excused their expansion on the ground that they wanted only enough of the market to provide "stability" and "honesty"—and they estimated that 20% would provide that. That sort of talk is out today. Instead, the general manager of the Farmers Union Grain Terminal Assn. of St. Paul baldly stated at his last annual meeting that he was working toward absolute control of grain marketing in the Northwest. The California Fruit Growers' Exchange handles 87.5% of all lemons in the United States. The California Walnut Growers' Assn. handles 73% of all walnuts. And the National Farm Machinery Cooperative looks to the day when "every farmer in the U.S." can have a co-op tractor.

Gone, too, is all co-op pretense to superior "goodness" in business, as was forcibly demonstrated when the New York Dairymen's League Cooperative Assn. and four of its officers pleaded guilty to pegging milk prices to consumers and paid $29,000 in fines.

Out into the open has come the urgent desire of at least some co-ops for an alliance with the left-wing element of the CIO. According to the Columbus (Ohio) *Evening Dispatch*, in its story on the meeting of the National Cooperative Congress, "delegates were handed copies of a report by the 'labor-cooperative committee' of the congress which charts the future course of the American cooperative movement hand-in-hand with the CIO to bring a combined city-rural pressure to bear in achieving a 'non-profit' system of enterprise in America.

"In a speech generously sprinkled with denunciations of the 'profit motive' and 'free enterprise' in American business, while praising key political and economic policies which come to be identified with the CIO, Mr. (Murray D.) Lincoln urged cooperatives to be prepared to assume control and management of the nation's business and agriculture in the coming 'revolution'."

And into the stratosphere have soared the figures which prove—as nothing else does—that the co-ops are fully capable of achieving their goal so long as their profits go tax free. Last year's total volume of $12,000,000,000 will easily hit the $25 billion mark in 1950 at the present rate of tax-free growth.

Clearly, the co-ops are on the march—and their ability to dodge income taxes is their greatest competitive strength. Private, taxpaying business has at last waked up to that fact, and Congress—much as it hates to tackle so violently controversial a subject—is also coming alive to the danger that faces our economy if the tax advantage is continued and the co-ops are permitted to go ahead pyramiding their tax-exempt earnings as they now do.

The necessary changes in the law will not be made easily—that must be admitted. The cooperatives will not willingly give up the privileges Congress gave them in 1916. As has been

proved all too many times already, they are potent in-fighters; and in the coming battle they can be expected to punch and gouge and knee; to try to confuse the public and Congress with double talk, and to wave pitchforks in the faces of our national legislators as they did a couple of years ago in the Kansas state house.

For a long time, of course, the co-ops had nothing to worry about. No one stood in their way. No one opposed them. No one knew how they were using tax freedom as a stepping stone to power.

Then slowly the independent tax-paying American business man began to awaken to the peril he faced. The cooperatives were out to get him—and in many, many cases they were succeeding. Naturally, the business man began to complain, to get angry and finally to arch up his own back and fight.

The co-ops came back in kind. But the going was getting rough. True, they kept right on growing and expanding, pouring their untaxed, undistributed profits back into their businesses. But now, for the first time, there was always someone ready and eager to raise the question: "What right have they to escape federal taxes? Where is our long-established American equality?"

In the face of such questions, the cooperatives went on the defensive. And immediately they began to expose the holes in their line.

"You can't tax a profit that doesn't exist," they shrilled, only to have the words flung back in their teeth. Because by their own figures the co-ops showed clearly not only that thousands of them make profits year after year, but that scores of them actually net from a million to five million dollars and upwards. And furthermore, the government has said that in the field of taxation, income, from whatever source derived, is taxable.

"Cooperatives pay all the taxes that the law requires," their leaders claimed, and listed property taxes, social security taxes, excise taxes and gasoline taxes—the latter being a phony because the gas tax is collected from customers and forwarded without addition to the Treasury. Many of them boasted, too, of the federal and state income taxes that they paid—though it is easily demonstrated that the amount paid by a non-exempt co-op is a small fraction of the total paid by a competing privately owned business. And so that's a phony, too.

"It would be unconstitutional to tax the co-ops," they say, although one of their own attorneys, Randolph E. Paul, formerly of the Treasury Department, says that's a lot of nonsense.

"Declaration of a non-profit purpose in the charter or by-laws of a co-operative association prevents its having a profit," the co-ops maintained. Yet on numerous occasions the courts have ruled that, under the income tax law, the actual operation of a business —not its non-profit declaration—controls.

"Cooperatives act only as agents for their members," the co-ops shrieked, rushing to defend a particularly vulnerable point. But it is clearly demonstrable that none of the relationships which characterize an agency exist between a cooperative and its members.

"We're being accused unjustly of being socialistic or communistic," the co-ops screamed, apparently oblivious of their own leaders' statements that "we must get rid of the profit system and replace it with the cooperative system."

And so it went, from bad to worse, until finally, in recurrent desperation, the co-ops began to seek to compromise the issue.

First, they said that maybe it would be all right to tax the big cooperatives, but let's leave the little ones alone—unmindful of the obvious fact that the little co-op is the competitor of the little partnership of individual proprietorship on Main Street. Then they suggested a limitation of the reserves that a co-op might accumulate tax free. Finally, in a fit of shrewd and beguiling generosity, they brought forward the idea that other businesses should also be permitted to pay patronage dividends, just like the co-ops, and deduct the payments from their taxable income.

Private business has rejected all of these compromises, because, fine as they sound, they just don't hold water. No one of them would bring about the tax equality that private businessmen demand.

The first test vote of Congress's attitude toward federal income tax equality was taken in the House of Representatives last Feb. 26. The issue before the House was not tax equality in so many words, but every representative was fully conscious that taxation of the cooperatives was in the picture, for the co-ops themselves had put it there.

The question before the House was whether the 80th Congress should re-create a special committee to study the problems of small business. The co-ops bitterly opposed this suggestion because they feared that the new committee might choose to re-examine the report whitewashing the cooperatives which was issued by last year's committee under the chairmanship of Congressman Wright Patman of Texas.

Patman had done a fine job for his tax-exempt friends. In a "unanimous" report—which strangely enough went unsigned to the printer — he had claimed that cooperatives have no tax advantage over the businesses that chose to do business in the cooperative manner.

Naturally, the co-ops were anxious to keep this sentiment in the public records. But another member of the 79th Congress's Small Business Committee, Representative Walter C. Ploeser of Missouri, was equally determined to wipe the slate clean. Having completely repudiated the Patman report, he asked the new Congress to recreate the Small Business Committee.

On the day when the Ploeser resolution was scheduled to come up for vote, there came from the four corners of the country an avalanche of telegrams demanding that each Congressman vote "no" and bury the Small Business Committee for all time.

Congressman Clifford Hope of Kansas, chairman of the House Committee on Agriculture, received four telegrams and read them all into the record. They were all pretty much in the same vein: ". . . . Small Business Committee is a misnomer; should be anti-co-op committee. Our information is that the chief purpose is to discredit the previous Patman Committee. Patman was fair and unsought by cooperatives. . . . We urge you to vote against Ploeser's resolution."

The co-op protest lost. By a vote of 270 to 92, the Small Business Committee was re-established. And subsequently, in April, Mr. Ploeser was named its chairman.

Thus the co-ops lost their first skirmish. But they didn't quit.

Early in March, Fulton Lewis Jr., ace radio commentator, opened up a series of broadcasts in which he told the listening world what he had learned about co-op tax dodging. He minced no words. He told how "loopholes in the income tax laws and regulations are legalizing the evasion of hundreds of millions of dollars in corporation income taxes, thereby financing the mushroom growth of a tremendous new system of super-big business monopolies throughout the nation." And in subsequent broadcasts, he told of the "outright dishonesty" of the co-ops' public statements.

The co-ops retaliated swiftly. They demanded that the Federal Trade Commission put Lewis off the air. They besought the Mutual Broadcasting Company to drop him. They bombarded Lewis' sponsors and the local radio stations that carry his broadcasts. Finally, they undertook to institute boycotts against the sponsors.

But Lewis kept right on—and so did the co-ops.

A number of state legislatures had begun to consider bills to impose state income taxes on the cooperatives. In North Carolina the co-ops so packed the hearings (outnumbering private businessmen three to one) that the hearings had to be moved three times to larger halls. In Maryland they filled the newspapers with ads attacking both businessmen and farmers supporting tax equality, and on a day when the measure was before the state senate, five co-op leaders invaded the floor of the senate itself to buttonhole members and try to change their votes.

For such tactics, there is only one word: coercion. And yet these tactics should not surprise the independent businessman who has watched the co-operatives these past few years. They are merely symptomatic of the revolutionary nature of cooperation.

Independent, taxpaying businessmen everywhere must remember this fact. In the days ahead, as Congress goes deeper and deeper into the question of taxing the co-ops, electrical appliance dealers, contractors, power companies, all must join with fellow businessmen in presenting their case on Capitol Hill.

It is a strong case. About that there is no doubt. The facts are few, simple and compelling:

1. Because they are exempt from payment of most, if not all, federal income tax, the co-ops are growing many times faster than their taxpaying competitors.

2. Because the co-ops are able to pyramid their untaxed earnings, they are buying or running their taxpaying competitors right out of business.

3. If they succeed in destroying private enterprise and in taking over all U. S. business, who will make up the billions in tax revenues thus lost to the government?

4. And if they bankrupt the government, what is to prevent the co-ops, and more particularly, their red backers, from completely taking over the government?

These are matters that will be considered by the Ways and Means Committee both during the days of the hearings and in the months to come when the subject will be intensively studied by Congressmen and by government's tax experts. There will be no legislation until early 1948, when the whole federal tax structure is overhauled.

Then the co-ops and other tax-exempts will be required to pay their share of the federal tax burden—if businessmen insist. But businessmen must speak up—and continue to speak up—if they are to have their way.

WHAT ABOUT THE NERA

A dynamic Denver Dealer who is vice-president of the National Electrical Retailers Assn. answers the questions being asked about this new organization now seeking memberships in the West. He believes there is a place for it alongside other industry organizations without conflict with local leagues and promotional associations already functioning

DECIDEDLY dealers do. This was Herb Names' answer to the question, "Do you electrical retailers need a national association, and why?" There were other questions too. "What can it do for you that your local league cannot do? How does it fit in with the local league or association idea? Will dealers support it?—and the league too?"

There were also questions as to what this new association is—the National Electrical Retailers Assn., or NERA. Who is running it? What is he like? What is its set-up? Its program? Who belongs to it? How is it financed? What has been accomplished so far? What are its prospects for success? Who are on its field staff? What kind of headquarters staff is maintained? What services does it offer its dealer members? Is it a defense organization only or does it have a constructive program as well?

Now, before the answers, perhaps a bit about Herb Names, to whom these questions were put. Both as a dynamic dealer now operating three stores in Denver, and as vice-president of NERA, as well as regional governor for it, he should be in the best position to answer these questions the industry has been asking about this new organization.

Herb Names is one dealer whose energy, resourcefulness, good business sense and experience could make him independent of the need for an association, if anyone was. If he feels that a national association is necessary it would not be to serve as a crutch. He can sell his way out of any problem he has ever faced. On the other hand, he has always been one of the leading cooperators among the dealers of Denver in the Rocky Mountain Electrical League. Hence, he should know how the NERA and the local league fit together and whether there is any antagonism between the two, any conflict of interest.

His experience goes back to the time he ran the appliance department for a large music store, then went into business for himself and ran it successfully in competition with an aggressively merchandising Public Service Co. of Colorado. When the war came along he was agile, shifted his footing to repair service, which he featured in the front windows of his store as he had previously featured appliances, the Bendix washer and other demonstrations. At war's end he was all prepared for expansion and opened two new shops in two of the new growing neighborhood shopping districts of Denver. So in Herb Names it is no visionary talking. He *is* a dauntless optimist. He *is* a ball of fire. But he keeps his quick moving feet on the ground, nonetheless.

And he is emphatic that electrical retailers need an association just as the electrical contractors have NECA, the wholesalers have NEWA, the manufacturers have NEMA, the utilities have EEI and the inspectors have IAEI. Before the war NERA began organizing dealers but never grew out of a small region around Chicago. During the war

there was no organization to speak on behalf of electrical dealers. As a consequence they were squeezed by OPA, denied by WPB and generally kicked around by other agencies which considered being in business wicked.

Having national associations and even local chapters has not prevented these other groups of the electrical industry from affiliating with and taking their part in the local electrical league, bureau or promotional association, says Names. Besides, there are some problems facing the dealer with which only his strong national association can cope.

Instead of being a rival to the all-industry local promotional organization, Herb Names feels that the local NERA chapter can assist it. For one thing it takes the heat off the league in dealing with some questions that are not within the scope of the league.

One of these is the major project of NERA at the present time, a project initiated by Names himself, by the way. It is a concerted drive to have restored to dealers their full margin on appliances, the margin that applied before OPA squeezed dealers between its maximum price to the consumer and the increases granted the manufacturer to meet rising labor and material costs. Having manufacturer and distributor memberships as well as dealer memberships, the league would find itself embarrassed to insist on such a program. Not so a national association of electrical retailers.

Never belligerant himself, Names does not feel that NERA ever need be so in dealing with such problems. His experience in industry activities leads him to feel that a basis of good sound business can be found on which to adjust such issues with the dealer's suppliers. But the individual dealer will not find himself alone in presenting his case. He will have the backing and firm determination of his NERA to make his cause heard, and he will have an experienced advocate to present it for him to headquarters.

How the 40% functional profit margin campaign started illustrates the democratic process by which the NERA operates, Names maintains. Its program arises out of the needs and requests of its members. Asked what he felt was a need that dealers all had and on which the association could work, he wrote a letter Jan. 4 to C. C. Simpson, managing director of the dealer association, which in turn was submitted to the board of governors and the policy committee at its meeting Jan. 17 in Chicago.

"In their eagerness to get merchandise in the hands of consumers at retail prices lower than those of their competitors, I wrote," said Names, "many manufacturers are taking advantage of the merchandising shortage to squeeze their discounts to retailers and distributors. What this does is to make it impossible to make sufficient profit to cover the cost of selling and handling the merchandise, to say nothing of promoting it.

"In view of this, I said, there should be a movement to demand a functional 40% as a minimum on all merchandise purchased, including replacement parts.

"Because all nationally known appliances are now nationally priced the dealer has no chance to adjust the price in his community to a workable 40% or better profit margin if it is needed.

"If we are to have capable, high-class sales organizations throughout the country, eager to convince the millions of American families that electrical living is better living, we will have to have a profit structure that permits the payment of salaries or commissions to compensate salesmen of this caliber. For a long time, I know from personal experience, the music and furniture retail outlets have had such sales personnel. But they have had a profit margin to support it.

"In effect the manufacturers say to us, 'Better trim your operating costs because the profit margins are going to be even shorter.'

"If they get any shorter the independent electrical dealer who depends solely on the profit from the merchandise that he sells, will be choked out of business. If that happens, manufacturers will find they have insufficient outlets to absorb and sell the tremendous production of merchandise they are geared to turn out.

"Through NERA we can bring these realities to the attention of the heads of the manufacturing companies. There is nothing we can do at the local level. Our distributors are in the same squeeze. Those that are manufacturer-owned may be able to pass their costs on up but the independent wholesaler, like the independent dealer, just can't take it. It costs us money to sell. It costs money to open the door every morning. We cannot do it without being recompensed.

"As a national association of dealers we can acquaint all dealers with these facts of life. Maybe a lot of these new boys that have just started in business do not know these things. All we can do is tell them, and urge them to buy and to promote vigorously the products of reputable manufacturers that do provide the margin for this.

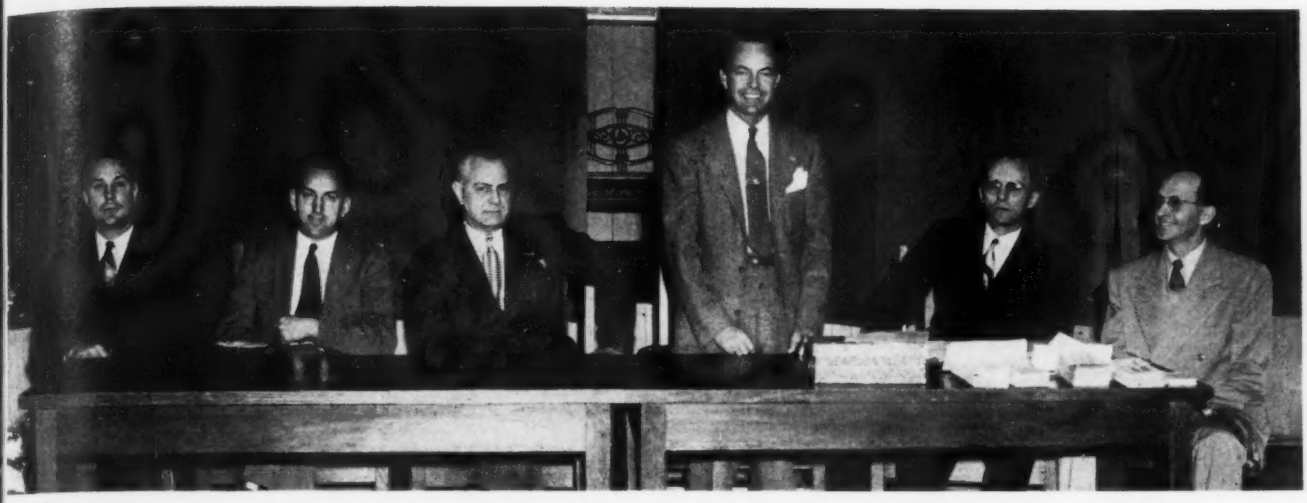
"We can show the manufacturers that it is only natural that business will go to those who make it worthwhile to sell their products. It is only natural also to expect that dealers who realize what they are doing will buy as little as possible of the merchandise that costs them money out of pocket to sell. Certainly they can't be expected to promote it.

"Now I don't say 40% is always enough. Some new appliances, that nobody knows much about yet, may cost a lot more to demonstrate, advertise and sell. But that 40% is about the minimum. What we mean is that the margin should be based on real facts. We have to train salesmen. We have to pay them enough to make it worth while to put in the extra effort. We are going to be faced with trade-ins, more collection costs, higher cost of running the business, and very soon some marking down on last year's models."

It is in things of this kind that Names feels NERA to be very necessary to dealers. In such programs as the return to a 40% discount it can do for the dealers what few leagues will wish to attempt. He feels that dealers will support both NERA and their local promotional league or bureau. In fact a major part of NERA's program is aimed at organizing dealer support behind the industry's national drives—Adequate Wiring, Better Light-Better Sight, Go All Electric, Farm Electrification, Electrical Interdependence, Radio in Every Room. It will urge its members and its chapters to participate in and take leading places in electrical shows, expositions, campaigns. It will advise them to join their local league or bureau and get back of every worth-while activity it carries on. It will urge them to work through such leagues to arrive at non-restrictive wiring programs in cooperation with contractors and inspectors.

The trouble with the National Electrical Retailers Assn. before the war was that it lacked the constructive leadership and management which Names feels it now has in Clifford C. Simpson, its managing director. Simpson, personally known since college days by some of the leaders in the electrical industry, made a success of organizing and operating the independent tire dealers association. One of his first acts was to establish a Washington office from which he could go to bat for retailers among the government agencies whose regulations and influences affect electrical dealers. The original office in Chicago is still maintained but only on a minor basis.

How the organization is set up was also sketched briefly by Names. Originally each local area, consisting of the area around a city or trading center, would have a local committee of



Harold Taylor, Pasadena dealer, regional governor for NERA for West Coast states, at organizational meeting of the Pasadena chapter. Left to right are: J. R. Strayer, Huntington Park dealer and local NERA chairman; F. V. Frey, superintendent, new business department, Psadena Municipal Light & Power Department; John C. Olsen, mayor of Southgate, local NERA chairman and an electrical dealer; Harold Taylor; Elmer J. Weinheimer, Western division NERA regional field director; and F. J. McDonald, NERA southern California and Arizona field director

dealer members. This committee of from five to nine members would elect a chairman. A chapter of the association would thus be set up. Several such local areas constitute a division and these committees elect a chairman for the division. In large states there may be a state chairman elected. Corresponding to the twelve Federal Reserve Bank regions there are twelve regions, each of which is headed by a governor, elected from the membership of the region. These governors constitute the board of directors of NERA, and from them are elected a president, vice-president and secretary and treasurer. The paid staff of the association is then selected by this board. It consists of the managing director and a field staff of seven men. At headquarters there is being set up a staff of department managers, each charged with producing, disseminating and furnishing advice on merchandising, advertising, business efficiency, store appearance, exhibitions and shows, sales promotion and similar services. It is the aim of NERA to furnish to the independent electrical retailer the same kind of expert counseling service that the chain organizations provide for their stores and store managers.

So far appointed for the West are Elmer J. Weinheimer, as field director for California, Oregon, Washington, Utah, Idaho, Nevada and Arizona, who has working with him in southern California, F. J. McDonald, of Pasadena and John T. Burns of Denver, who is field director for Colorado. Others are being selected and trained to render field service in the areas to which they are assigned.

The two regional governors for the West are Herb Names of Denver, and Harold Taylor of Pasadena, both aggressive, devoted dealer-leaders. Lillian Johnson of Bremerton, Wash., is a member of the manufacturer-wholesaler relations committee, which with the board of governors, was due to meet in Chicago, June 2-4. Purpose of this meeting is to map plans for an improvement of relations between manufacturers, wholesalers and dealers and one meeting will be held to present the NERA views to manufacturers. Names is chairman of this committee. President of NERA is Paul Kees of Kees Appliance Co., Madison, Wis.

Dues which support the organization are modest, a straight $25 a year. Questioned whether he thought this enough to support the type of service and the amount of traveling and field work required, Names said that it might later be necessary to graduate dues on some different basis but that at present the dues are being kept at a minimum to make it possible for even a very small business to belong.

So far the organizations in the West is in the formative process. The membership is scattered and the number of fully operating chapters is small but local committees have been set up in 21 California cities and towns by the end of March and there were members in 73 California cities and towns in February. Since that time California and Colorado have been among the top states in reporting increased membership and organization.

Regional field director Weinheimer for the Western Division just returned in May from a trip through the Northwest in which he contacted dealer associations with a view to inviting national affiliation and during which he secured members and set up local committees preparing for chapters in Walla Walla and Yakima, Wash., and Pendleton, The Dalles, Hood River, Salem, Eugene, Grants Pass and Klamath Falls, Ore. He plans a trip to Arizona and Nevada in June.

In Colorado Herb Names and Richard Quaintence of Denver, Henry Vogel of Sterling, Louis Hunter of Ft. Collins, have been active in promotion of memberships and in organizing opposition to the "package mortgage" bill that was proposed in the Colorado legislature.

Harold Taylor, president of L. C. Taylor Co., has put in a great deal of time and energy for the organization in southern California, calling meetings, addressing them in other cities and towns, getting members. Phil Urner of Bakersfield organized the first chapter in the San Joaquin Valley.

Among the regular services offered members is a weekly newsletter from Washington giving news and trend information and acquainting members of the problems and progress of their industry. NERA also is publishing an appliance trade-in guide to be furnished all members. A monthly sales service bulletin is also issued, to make selling and display suggestions. Personal sales and merchandising guidance service is also offered when members write to the headquarters at 1304 I St., NW, in Washington.

To sum it all up, the National Electrical Retailers Assn. seems to be on sound footing, has a constructive as well as a defensive program, is capably led and is representative of actual electrical dealers.

HIGH COST OF BUILDING

Everyone is complaining about the high cost of building. The public is doing more than complain—it is not buying any more construction than it can avoid. Contractors are wondering if they are being priced out of business by rising wage demands and added overhead on handling labor. The considered opinions of several contractors are expressed as follows:

YES, the contracting business has been pretty good for the past several years. Wartime construction was all on an emergency basis. Cost did not matter. It was a matter of getting it done. Wages could and did go up. There was lots of overtime. Any punk could get journeyman's wages whether he knew anything or not. There was only one customer, and he was in a hurry. Uncle Sam could pay whatever it took.

As the war ended there was such a backlog of need for housing and modernization, repairs and expansion, that the contracting business was good too, in spite of rising costs and wages. There was lots of money still in circulation, people were buying, spending. Merchants could expand and manufacturers of things enlarge their plant capacity.

But now contracting is beginning to slow down. At first it was lack of materials that held it up. Now it seems to be lack of money—at least an unwillingness to pay what it now costs to build anything. Just what is back of this turn and what does it forecast for the next few years?

Every sort of survey of the future market is unanimous that the need for and the desire for new construction, new housing, new plant expansion and modernization of old houses, stores, office buildings and plants is tremendous. Last month's issue carried a survey by the Twentieth Century Fund in which the prospects for construction in the period ahead from 1950 to 1960 are shown to be greater than in any of the 19 industries listed.

If this is so, then what's the matter? Why the slump now?

A good many electrical contractors think and say that they are being priced out of business. Facing a new campaign for wage increases, plus additional social benefits supposed to be added on to the consumer's bill, they wonder if their union labor is also pricing itself out of business.

The public is not buying any more construction than it can help. Even such public works as schools are being held up after being put to bid and discovery that the bids are higher than estimates and more than the appropriations with which to build them.

This is very evident to the contractor, who is in direct contact with the customer at the bill paying end of the business, whereas it is not yet appreciated by the electricians, and least of all, seemingly, by their leaders. By leaders is not meant the national officers, who seem to be aware of the danger but unable to quiet the demands of the locals. It is often the executive board of the local, some business agents and the more vocal of the membership, who keep insisting on more wage boosts regardless of the consequences.

Contractors are not very good at writing their views. Besides they are plagued by a variety of problems. Labor is only one of them, although of late it has claimed more of their time, energy and money than any other phase of the business. Some are even browbeaten into not being willing to express their views on the subject for fear of personal reprisals by the union which they are dependent upon for their workmen. But many can see coming again a situation that followed the last war and which resulted in the greatest setback the unions ever received. Older heads remember that time very well.

It was in 1920, in the reconstruction period following the last war. The similarity of conditions is here now in almost every detail. Wages had been driven up by increasing demands during the war emergency to a level that discouraged the public. It refused to pay the prices that such wage scales required. The unions would not face the facts and scale down. Peaceful negotiations failed and shops closed down. When they reopened it was as open shops and at a scale that encouraged the public once more to spend some money to build.

One substantial electrical contractor, in business for more than 25 years, recalled the 1920 period vividly and asked, "I wonder if they aren't just inviting a similar collapse of all the strength they have acquired under the Wagner Act. If the labor legislation now being written in Congress is passed, making the closed shop illegal, perhaps some of the impossible conditions of hiring, apprentice ratios, demands for travel time (portal-to-portal in theory) and other costly working rules, can be dealt with in some fairness to the public and the employer. Right now they are on an 'or else—' basis."

"It all sounds very good when only one side of the story is told," said another contractor, referring to the very clever campaign of publicity the CIO warehousemen's union was carrying to the public in the San Francisco bay area along with demands for more wages and shorter hours of work. "It sounds very reasonable when the union points to the rising cost of living and baby's shoes and says it only wants 10 or 15 cents more per hour, and then reasons that its buying power is very important to the whole community. Makes the employer look like a hard-hearted, greedy rascal if he refuses such appealing arguments.

"But nobody stops to figure what the overhead on labor is, and at what price the employer has to sell that labor per hour in order to pay this increase of only ten cents. And nobody mentions that all of this has to be put into the cost of living and will boost it also. In warehousemen this is particularly true, for since almost anything that is made and sold has to go through warehousing and handling at some time or other, everything must carry this increased cost.

"In contracting, let me list a few of the costs of handling labor so that you can appreciate why, if we have to pay a journeyman $2.15 an hour in-

stead of $2, we will have to charge the customer from $3.50 to $4 an hour, depending on the type of work and the facilities we have to provide to back up the man doing an hour's work.

"On top of the raw cost of labor—or wages—there are required by law compensation insurance, social security and unemployment insurance fees. Beginning May 5 the union and National Electrical Contractors Assn. agreement requires a 1% of labor pay roll contribution to the union pension fund.

"After that comes the cost of doing business. First there are the stockroom and delivery costs. If warehousemen get their raise this will increase too. Delivery costs reflect the higher insurance rates on vehicles, higher costs of maintenance and increased price of gasoline.

"Office overhead is in this too. Because of taxes and social security the amount of accounting that is associated with every man working with the tools is higher than ever. Keeping of records, storing them, having them reviewed by tax and government agencies, all cost money. And if the electricians get a raise the office force soon hears of it and expects one too.

"Then there is engineering, estimating and supervision cost that has to be borne. With a decline in business, sales cost goes up. Our engineering salesmen have to be more active in order to stir up business. As work slacks off more of us contractors are bidding on each available job so more of us make expensive estimates that are wasted expense if we do not get the job. Our estimators, like everyone else, get more pay than before the war.

"Supervision is really costly these days. There are so few qualified electricians that it requires more watching in order to avoid costly mistakes and waste of materials. Cost of tools owned by the shop are also higher.

"Purchasing costs never were so high. I estimate that in my business it costs ten times what it used to. Before the war we could call up and order, or the wholesalers' men came around and took our orders and we could be sure of deliveries. Now we have to phone, telegraph, and make trips personally to buy and to expedite shipment. It all takes money.

"And, whether anybody realizes it or not, associations dues, charity and community activities have to be carried in the cost of labor to the customer too. Associations are more needed now than ever, and they cost more to belong to because we have to equip them to do costly negotiating. Have you noticed how many more charity drives there are now? Beside the Community Chest there's the Red Cross, that used to be included in it, and a hundred other requests for funds, all worthy and very hard to turn down. There are two or three in my mail basket every week, it seems to me.

"Besides the chamber of commerce there are employers' associations, local celebrations and a man's political party to help along.

"While each one is a small percentage, it makes a total overhead on labor that is about half of the actual labor cost itself. Materials have to carry a similar overhead charge. In some classes of work this is pretty hard to get because the wholesalers often sell materials direct to an industrial customer at our cost, or very little above it, and makes us a labor broker. Then more of our cost of doing business has to be carried on labor.

"I haven't mentioned taxes, but they are all up 50% too."

This contractor went on to say that in negotiations with the union over new wage agreements the contractors often are not even permitted to present these factors. An agreement is handed to them and they are told to sign it or get no men. Pleas to the international office of the union bring sympathy from its officers but no help or relief. Each union is autonomous and drives for as much as it can get for itself. Headquarters policy is seemingly advisory only, for one local can force some conditions on contractors that are counter to national policy and if persuasion fails nothing can be done about it.

"Lately business has dropped off," said another contractor, "and it's really a relief. We can lay off some of these punks that are given to us as electricians and try to operate with a few men on a smaller scale. Our customers send back their bills to us. complaining about the size of them and the poor workmanship and lazy and indifferent men. It is my observation that nearly all contractors would welcome a shut down in order to get some sense back into this business. There doesn't seem to be any other way it will be done. It was that way in 1920. I don't think anybody learned anything from that crash, so I suppose we'll have to learn it again the hard way."

In one shop the proprietor finally came to the conclusion that he had to bring the matter of inefficiency to the attention of his men. So he prepared a letter such as the one illustrated with this article and put it on the bulletin board. He inserted a copy in each pay check envelope. After it many of his men said, "It's about time. We see this going on and if we have any pride in our workmanship it gripes the hell out of us, but we don't

What One Contractor Told His Electricians

We, as employers, are seriously concerned about the future of our electrical business, and we think that you as an employee should be interested too.

The big problem is that our customers think our jobs cost too much, so they are beginning to cut down their plans for expansion and are just buying what they absolutely need.

Now these customers are no different from you and I. We hesitate to spend money where we do not get our money's worth.

In discussing this matter of the cost of electrical work, we do not mean to argue the cost of wages vs. the cost of living, because the scale of pay is not the principle reason for the high cost of our construction jobs. Our job costs show that the principle reason for the high costs today is the inefficiency of the average mechanic.

Many of our bills are protested by our customers because of the high cost of the labor and the following are the complaints that we get:

Men loaf on the job.

Men stop work in the middle of morning and afternoon for cup of coffee.

Men leave job at 11:45 and 4:15.

Men arrive on job after 8 a.m.

Now this customer is paying the bill for your time, so why should he not kick when he sees you wasting it. You should think how YOU would feel yourself if you were in his position.

The thing to realize is that the CUSTOMER is the BOSS—YOUR boss and MY boss, and if we can not please him we BOTH lose.

Let us get together and see if we can not stop this trend and save our business. Your comments will be appreciated.

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That the high cost of building is not universal was learned by another contractor on a trip East. From Eastern newspapers he brought back advertisements offering two-bedroom bungalows, equipped with electric range, water heater, refrigerator, circulating coal heater, hardwood floors, lots of closet space, a fireplace and screened-in porch on a large lot near school and shopping district for $5,950, at $40 monthly payments. Such a house, this contractor knew from experience, for he had been asked to figure the electrical work on a group of them, would have to sell for $10,000 to $12,000 in the western city in which he operates. As a result, this and similar house building projects have stopped in their tracks. The people who can afford to buy houses at that figure seem to have done so. The market for houses that needs somehow to be filled at this time can afford to pay less than $6,000.

The example just given can be multiplied many times. It was significant that when *Life* magazine recently pictured a model, modern, simplified house it gave building-cost estimates of about $17,000 for it. A subsequent issue carried letters from two builders in the East who offered to build such houses for a great deal less money; almost half.

There are several upheavals possible. Rumblings of them are already being heard like the forewarning of an earthquake.

Prefabrication is one of them. But it is finding slow going because it runs into either local building codes or union restrictions that prevent this mass production economy from finding an outlet.

The other is a movement gaining momentum, coming out of the building officials and the League of Municipalities, to abolish all local codes and ordinances and to enact a simplified state code which would use the National Electrical Code alone as its basis. This is not as simple as it sounds, for the California Electrical Safety Orders, now being revised, take precedence over everything in occupancies where people are employed. But the movement is more widespread than California alone.

It can spread, fed by the public dissatisfaction with the lack of housing and the high costs of building.

It is argued that the electrical portion of a home is only three or four per cent of the total and that any cut in it will be small as compared to the total. While this is true, it is a sophistry, for each part of a building can claim the same thing, yet these small percentages add up to the present high total cost of building.

Up to now it has been a threat of a strike from labor that has sent everyone scurrying to appease and meet the demands. A reverse situation is in the making. The public is beginning to strike, and in doing so is going to force the contractor to do so too. It would be real statesmanship and genuine assumption of its responsibility on the part of labor to recognize this demand from the public and seek to make adjustments to the wage scales and working rules that would stimulate building. There could be the biggest building boom in history, with profit to workers and enterprisers and value to the public, if each would willingly make some adjustments to trim down the high cost of building.

Are We Pricing Ourselves

This electrical contractor thinks

Yet he makes some constructive

E. L. Buttner, prominent electrical contractor in Oakland, president of Scott-Buttner Electric Co., Inc., and governor for the Northern California Chapter of NECA, was asked his opinion. He analyzes the situation very clearly in his statement which follows, and ends with constructive suggestions as to how the situation can be improved by all parties to the present costs.

"Are we priced out of the market?" said Buttner. "I think we are beginning to be. This is the way it appears to me:

"In home building this occurs when that portion of income and saving which the consumer has to spend, will not buy a home that meets his needs.

"I believe a typical example is that of one of the members of my firm, who purchased a lot in 1940. He had plans drawn up. Then the war restrictions stopped him from building. His 1941 cost was estimated at $9,750. Today the same modest house is estimated at $17,500. The bank loan he can obtain, plus his available savings, will not finance the home, so he has given up the project.

"There have been practically no apartment houses built since the war. There is certainly a demand, but at present costs prospective builders hesitate to take the risk under present rental schedules. Not only the question of return, but the prospect of owning a high-cost unit in the face of possible lower-cost building in a few years from now, stops construction.

"What about commercial buildings? There are no rent controls there, but there most certainly is a law of economics operating in full force and effect. The return must be sufficient to justify the risk taken.

"First: the cost of the simplest kind of class III store building, which used to be around $2.50 per square foot, is now $4.50 to $5 per square foot.

"Second: taxes have increased both in rate and in assessed valuation. With new sewer bonds, increased welfare funds, and increased school costs, they

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"With wages at new heights, which certainly will resist reduction against anything but complete sales collapse, then lower construction cost can only come from a combination of:

"1. *Management* must improve methods, eliminate waste, simplify planning and study the market for availability and efficient use of materials.

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ELECTRICAL WEST

Freedom of Speech

EXERCISE of the right of freedom of speech implies a willingness to take the consequences of such action. Experience shows innumerable instances where failure to speak freely because of fear of the consequences has resulted in hasty, ill-considered or inconsistent action. Although the fault is not peculiar to the electrical industry, nevertheless this industry suffers unduly because controversial issues are not thoroughly aired. The reasons are well stated by our British contemporary, the *Electrical Review:*

"The first requirement in a democratic community is freedom of speech (including the written word). Perhaps we are too ready to take this freedom for granted because if we adopt the realist view we find that its suppression is almost as widespread as its enjoyment. Is any employee quite free to express views which are in opposition to the policy of his employer without fear of victimization, either by immediate action or by prejudices to his advancement? The position has been brought home to us so forcibly in the matter of nationalization of electricity supply. There has been no free discussion by individuals either in support of or in opposition to the government's proposals, with the very few exceptions of those who can afford the necessary degree of independence."

A sad commentary but a true one.

Now It's Official

EDITORS of the Los Angeles *Times* must be enjoying to the utmost their self-satisfaction for having almost single-handedly carried the torch for Hoover Dam since the name first was applied to the Colorado River project back in 1930. During all of the time when Interior Secretary Ickes decreed that the great dam should be called Boulder, the *Times* refused to concur and in its columns the reference was always to Hoover Dam. Now a Republican Congress and a Democratic president have made the name official. This action is appropriate. If ever a structure and a great man's name deserved to be coupled together, here was a fitting instance. Ex-president Hoover worked diligently to bring Colorado River development to fulfillment. When interstate bickering threatened to forestall all progress, as Secretary of Commerce he personally brought agreement in the form of the seven-state Colorado River Compact. While in the White House he supported and signed the legislation that initiated the development. Furthermore, Mr. Hoover is himself an engineer and there is ample justification for the *Times*' perseverance and Congress' final recognition of the fitness of the name Hoover Dam.

Power Shortage

APPREHENSION over a possible power shortage before the end of 1947 is not confined solely to the Far West, as some in the electrical industry seem to believe. Demand for power has run ahead of generating facilities in most regions of the country. Prophets who thought they saw postwar power surpluses have been confounded and as a result there are some exceedingly tight supply spots. Had the real extent of the potential electrical demand been correctly analyzed, it is conceivable that facilities to meet the demand would have been made available. However, the mistake was made and the immediate problem is to pack the load until relief can be provided by the new installations projected for 1948 and 1949.

Insofar as the Pacific Coast is concerned there are mitigating factors in sight already. In the Pacific Northwest where the situation appeared critical for later in the year, relief is being provided by a shutdown of aluminum potlines. If a total of 200,000 kw. is made available in this manner (which is likely) there will be no problem. In California fuel oil is and has been the cause for alarm. The oil problem is involved, but two conclusions appear pertinent: (1) a price differential which has caused large drafts on local supplies by off-shore vessels of all types which come into port with bunkers empty is certain to be corrected; (2) if there should be an oil shortage, the electric companies will have top priority for the available supplies. Finally, if there is any sort of a temporary business recession, demand might drop off to some extent.

EDITORIAL VIEWS

Until signs of actual trouble are more evident than they are today, we feel that the subject should be viewed as it was by the Northwest Electric Light & Power Association resolution committee—"an almost power shortage, which could or could not happen but isn't here yet."

Thirty Busy Years

LOOKING through the pages of the *Journal of Electricity*, as this magazine used to be called then, for the year 1917, 30 years ago, is a deflationary experience. The occasion for this retrospect is that it was in 1917 that the Pacific Coast Electrical Association was formed, due to the earnest efforts of the managing editor of the *Journal of Electricity*, Arthur Halloran. He became its first secretary. This month the PCEA holds its 30th anniversary convention in the same Mission Inn at Riverside in which the first convention was held.

The deflating discovery, however, is that there is so little new in our bright new world. Certainly there are refinements and improvements and bigger units. But basically there is not much really new except radar and television, and they are but extensions on the experiments that Dr. Lee deForrest was conducting in radio telephony at San Jose before 1917.

In the utilization field there have been refinements and improved efficiencies, but the appliances, motors, fans, pumps, were similar to if not as streamlined as today's models. The refrigerator for home use is the ice plant of those days reduced in size. The water heater element is now integral with the tank instead of being in a side-arm heater. Of course fluorescent lighting is new, although its principles were known and Claude had begun to apply them to tubular lighting in France.

The industry's problems of that day were the same problems it has today. To read the convention papers at meetings of contractors, jobbers, and the PCEA, is to think they must have been written for this year's meetings. Human nature has not changed appreciably in 30 years and most of the problems of today stem from human adjustments of self interest.

A glance at 1917 is deflating to the ego of today, but it gives perspective that shows the depth and breadth of this still new electric industry.

WHILE we are paying tribute to the fact that our industry has a sound plan to promote more complete wiring installations in homes, let us be perfectly honest and admit that both the Red Seal and Adequate Wiring Plans base their operations on standards which are actually a minimum. True, they are a great advance over the conventional wiring installation, but they still lack the completeness without which we cannot fully enjoy our industry's birthright. And many there are who don't or won't, for reasons best known to themselves, join in the movement to promote even this relatively low standard, let alone work to a level which will accommodate all of the electrical things which are available today. The need is great, it is pressing, and yet there is scarcely one of us who does not make excuses for not declaring this a state of emergency so far as our service traffic system is concerned and come to grips with it. I suggest that each one of us, now, vows never again to allow ourselves to fall back on such oft-repeated excuses as the wiring is hidden in the walls and has no glamor; we are short of staff; there is no money; there is a shortage of houses, so the builders can sell anything at their price, and they can't be interested in a complete wiring system; the electrical contractors are too busy and anyway, when the pressure eases up, they give their services away; why sell wiring when there are no appliances or electric current to serve them? . . . We've only ourselves to blame if these flimsy excuses force us to let the present inadequate wiring situation continue, and it will continue unless we face it and determine to go through with a program to wire America's homes —old and new—to a standard that conforms with modern electrical living.—O. C. Small, Manager, Business Development Department, NEMA.

A PROGRAM TO RELIGHT SCHOOLS

Although developed and scheduled specifically for California, this approach could be adapted to any region of the West to implement a drive where good lighting is perhaps most badly needed, and where it is certainly long overdue

John S. Walsh

THE one place where lighting people have made pitifully small progress is the school classroom. And yet, if we really believe that adequate and properly controlled illumination is essential to easy seeing, that gloom and glow not only make seeing difficult but also may cause permanent damage to the eyes—if we really believe this, then there is nowhere we should strive harder for what is best both in natural and in artificial lighting.

Having heard the statistics so often, we assume they are generally known. We know that 87% of all our impressions are visual and that teaching is principally a visual process. But who else knows? We are familiar with the fact that nearsightedness increases at an alarming rate concurrently with education (see Fig. 2). But are others equally familiar?

A survey of a recent graduating class at the United States Naval Academy at Annapolis showed that 59 midshipmen out of a total of 464 were refused commissions because of defective vision, and yet four years earlier these men had 20-20 vision when admitted (see Fig. 3). This exemplifies a situation which is deplorable, and at least in part preventable.

These are the facts which should be proclaimed, especially to school trustees, school superintendents, PTA groups and educational journals.

Let us put the problem on a personal plane. What does your child *see* when he's in school? Well, in the primary grades, six to seven hours a day, five days a week, he probably looks up to the blackboard to focus his eyes upon a group of words only to be confronted on a bright day with blinding glare from the sun. His eyes may simultaneously encounter a bright sky and a blackboard in shadow—a brightness ratio of 2,700 to 1. As he writes on white paper against the background of a dark brown desk top and dark oiled or painted floors, his eyes are attempting to resolve fine detail in that one-degree field of central vision under levels of 2 to 5 ft.-candles.

On dark days, if Edison's invention has reached his classroom at all, he may have the "benefit" of a few 200-watt lamps in enclosing globes. Actually, these may be more of a hindrance than a help.

Such classroom is no isolated or imaginary case. You remember such rooms from your own schooldays. They are still typical of *tens of thousands* of classrooms in California alone, classrooms where your own children are now spending their formative years.

It is now generally accepted that a satisfactory and comfortable school lighting installation depends upon two factors: adequate foot-candle intensity in the zones of critical seeing, and low brightness ratios between the visual task and the surrounding areas.

Adequate intensity on the desk tops means 30 to 40 ft.-candles maintained, in accordance with California Recommended Practice and the new IES School Lighting Recommended Practice. In the matter of brightness ratios, the standards of quality and quantity established by the IES call for a brightness ratio between task and immediate surroundings no greater than 3 to 1, and a similar maximum brightness ratio of 3 to 1 between the luminous portion of a lighting unit and its background. Such close control of room brightness requires light desk tops and light floors as well as light walls and ceilings. It also requires the substitution of light chalkboards for the conventional slate blackboards.

The most common sources of direct glare in the average classroom are the windows, the sky, and white buildings or walls which are in sunlight. Control of natural lighting is therefore a fundamental part of good schoolroom lighting.

The need for relighting, repainting and modernizing the tens of thousands of older classrooms in California is not at all apparent to school people. We may have done a fair promotional job in selling adequate lighting to industry, to store owners and office managers. We once made a start on selling adequate lighting to the residential market. But we've never made a concerted effort to tell the story of light and vision to school people.

The best way to sell school relighting is by means of a sample which enables school trustees, superintendents, PTA and civic groups, etc. to see for themselves what can be done to improve seeing environment at reasonable cost. Acting on this premise the Northern California Electrical Bureau in cooperation with a number of business firms undertook to remodel the upper fourth grade classroom at Oakdale School in Chico. What we had to work with was a room of typical early 30's construction, unilateral natural lighting with southeast exposure, dark brown desks, floors, woodwork and trim. There were slate blackboards, dark brown pinning strips, white plaster walls, venetian blinds but with heavy wooden slats, and two 200-watt enclosing globes.

During Easter vacation, the desk tops and floor were refinished and the room repainted by the Chico School maintenance force, with paint donated by W. P. Fuller Co. A local dealer installed light-weight aluminum blinds. The Northern California Electrical Bureau contributed the lighting fixtures and germacidal units, Sierra green chalkboards and light colored pinning strips and tackboards. The electrical wiring, outlets and fixture hanging were contributed by the Chico electrical contractor, Butte Pump Co. When the work was finished, the room appeared as in Fig. 1.

The choice of nine 500-watt silver bowl lamps and ring louver suspension units was made after considerable thought. It is hardly necessary to say that the first cost of a lighting installation is a matter of deep concern for the average school district. The whole purpose of the Chico experiment was to determine how inexpensively an average older classroom might be modernized. It has been suggested by the State Department of Schoolhouse Planning that the outer row of lighting units need not be installed for elementary classrooms having large window areas and never used at night. This is a possibility, but the relative location of the center and inner rows of units should not be changed.

Among the incandescent fixtures considered for the Chico experiment

John S. Walsh is chief illuminating engineer, Pacific Gas and Electric Co. In this article he describes the program he planned for presentation at June meeting of PCEA.

Fig. 1—Chico classroom, with incandescent lighting and germicidal protection, pilot model for high quality at low cost

Table I—Oakdale School Modernization

Rewiring	$200.00
9 Lighting Fixtures	166.50
9 500W S.B. Lamps	15.30
2 30W Germicidal Units	54.00
Venetian Blinds	94.50
Paint, Floor Finish	60.16
Chalkboard	43.25
Tackboard Covering	36.23
Total	**$669.94***

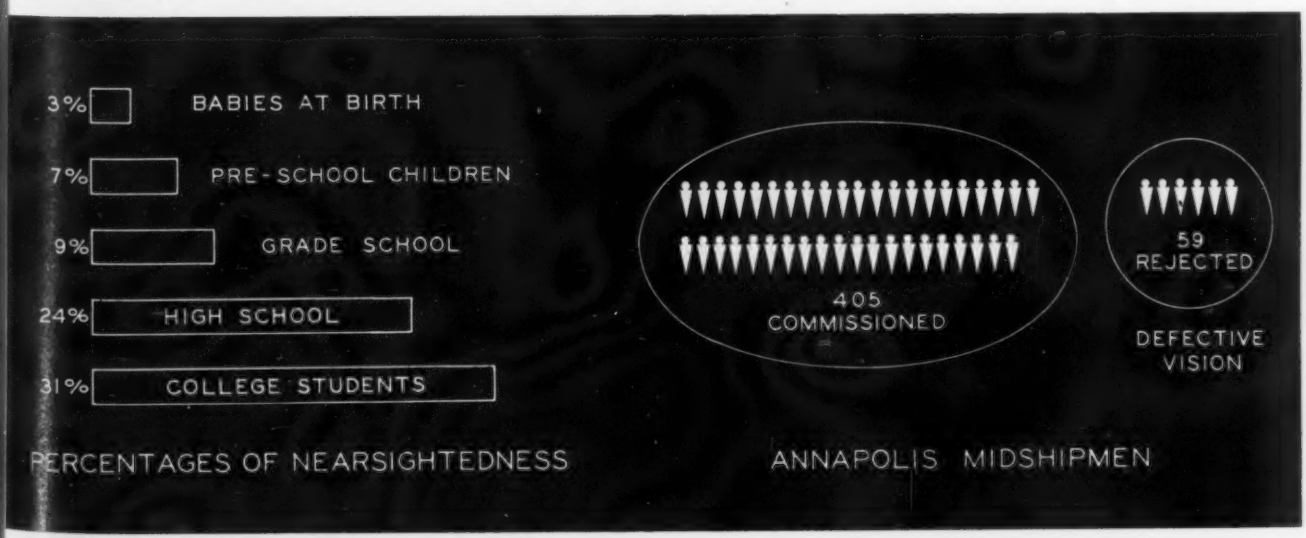
Table II—Number of California Classrooms

Elementary Schools	28,000
Parochial Schools	2,900
High Schools	12,000
Junior Colleges	1,700
Private Schools	1,100
State Colleges	500
Universities	3,800
Total	**50,000**

* Excluding painting and sanding desks and floors—190 Man-hours

Fig. 2—What poor lighting does to eyes in general

Fig.3—And what it did to an Annapolis class in particular



the silver-bowl ring-louver units were chosen because of their simplicity, low cost and ease of maintenance. Lamps may be replaced from the floor with a simple lamp changer; there is no place in the unit where paper wads, erasers and rubber bands can collect and reduce light output. Lamp replacement brings the luminaire back to its original efficiency without washing of reflector basins or surfaces.

Fluorescent luminaires were considered, but later eliminated, because the first cost of fluorescent units of comparable lighting control and output is about three times as great as that of the silver bowl incandescent units. As to wiring, so many older classrooms like those in the Oakdale School at Chico have two outlets per room, and two to four rooms per circuit that rewiring would be necessary for either fluorescent or incandescent installations.

Almost as important as low first cost is simplified maintenance. In the case of the small, one- or two-room school, the teacher can scarcely be expected to maintain and replace 40 or more fluorescent lamps which must be reached by stepladder. In the larger schools, where regular janitorial service is available, the maintenance of hundreds of fluorescent lamps and the regular cleaning of dozens of fluorescent units are chores not easily added to the regular jobs of the average maintenance force.

Where fluorescent units are warranted, the designer should stress the elimination of starter switches, the use of fewer lamps of higher lumen output, and a design which includes accessibility for lamp replacement and easy cleaning. Low cost is of vital importance and light weight is desirable.

For the Oakdale School experiment, two 30-watt germicidal units of the URC design were installed immediately above the pinning strip along the inside wall for irradiation of the upper air strata and destruction of air-borne bacteria.

Surface brightnesses were improved by refinishing. The natural maple finish of the desk tops and floors, protected by a coat of floor sealer, brought the brightness ratios between white paper on the desk top and the immediate surroundings well within the 3 to 1 maximum. Walls were finished in tropic green, and the monk's cloth pinning strip and tack board cover were dyed the same shade for comparable brightnesses. The brightness ratio between the inner ring louver surface and the ceiling is also within the limit.

The depressing blackboard areas were considerably improved by substitution of the new Sierra green chalkboards; this medium-green finish is still relatively dark, but an appreciably lighter surface would destroy the necessary brightness contrast between white chalk and the background. A white or off-white board might of course be utilized with colored chalk, thereby gaining maximum contrast within the board while achieving low brightness ratios between the board and surrounding areas. Colored chalks or grease crayons have not as yet, however, proven entirely satisfactory, but new and improved materials are continually being developed.

The success of a program for relighting, repainting and modernizing California's schools depends upon reducing the cost per classroom to an absolute minimum. The figures for the Chico experiment are shown in Table I. All prices quoted are list. No labor cost estimate has been placed on the 190 man-hours contributed by the Chico School maintenance staff in refinishing desk tops and floors and in painting and setting chalkboards.

What would relighting the schools of California mean to the electrical industry? Table II shows an estimate of the number of classrooms in California obtained from reports of the State Department of Education and other sources. It shows a total of 50,000 classrooms. Of this tremendous number, it is safe to assume that at least 90% need relighting. Visualize the dimensions of a lighting job covering these 45,000 rooms, even under the rather modest Chico plan.

As a practical program in California we might well start by recounting the advantages of adequate lighting in schools to the 800 trustees and superintendents who will attend a joint convention at the Hotel Fairmont in San Francisco during the week of Sept. 29. This convention offers an unparalleled opportunity to present the seeing story to school administrators from all parts of the state. Negotiations are now under way to provide a principal speaker from the lighting industry.

To give an on-the-spot demonstration of the possibilities in classroom renovation, Pacific Gas and Electric Co., in cooperation with the San Francisco Unified School District, is planning to modernize two older classrooms in the Commodore Stockton School. This building is within a few blocks of the convention headquarters, and inspection trips would be arranged by the convention committee. It is proposed that one of three similar adjoining rooms be left as a "control" for comparison purposes, one be given a treatment similar to the experimental room at Chico, and the third similarly modernized except that fluorescent units be installed. Costs would be carefully compiled and, together with estimates of operation, lamp replacement and maintenance, made available to the visiting trustees and superintendents.

Exhibit space in the Hotel Fairmont lobby has been offered at a nominal cost. Since the 800 school trustees and superintendents making their headquarters at the Hotel Fairmont during the convention week will be from all parts of the state, it might be wise and logical that the space be taken in the name of the Pacific Coast Electrical Assn. Arrangements might then be made to give the names of interested prospects to those association members situated in the area concerned. Such an exhibit might contain a shadow box with a changing display of Kodachrome slides showing before and after views of the Chico experiment and other model classrooms throughout the state, copies of the new IES Recommended School Lighting Practice, if then available, color charts.

The success of any long-range promotional program is determined by the follow up at the point of sale. If a school board does have a representative at the school trustees convention, there are still four members of the board who have not heard the seeing story, have not seen the demonstration classrooms. To fill this need, I suggest that the electrical industry cooperate with paint manufacturers and contractors, makers of Venetian blinds and chalkboards, and with the local school board in each county of the state, to modernize one old classroom. The cost to the individual utility, electrical contractor, wholesaler or fixture manufacturer is infinitesmal in comparison to the good will and certain return.

The school trustees of each county meet annually at the county seat as required by law. This is our opportunity to tell the advantages of a light-conditioned classroom to all of the school trustees throughout the state, with a model room as visual proof of what can be done at reasonable cost. In such a program, if the remodeled classrooms meet the approval of the State Division of Schoolhouse Planning, as does the installation at Chico, we are assured of their wholehearted support at these county school trustees conventions.

Such a long-range program can be carried to completion only with the participation of the entire electrical industry.

With such a program, we can give school children a bright and cheerful environment which will conserve their vision, make their learning easier, and give them a life-long appreciation of better lighting.

How are things in Pocatello

Are the people buying there? Despite the lost war boom there seems to be lots still cooking

Revisited only for an hour or two between train and plane recently there wasn't opportunity to do more than paraphrase the popular song, "How are things in Glock-a-mora?" to find out what the state of things, business-wise, was in Pocatello since a year ago when a longer visit was made.

E. W. Hall of Pocatello Electric Co. was emerging from the results of a fire in the top floor of the building his pioneer store was in. The fire did no particular damage to his stock on the first floor. But it enabled him to purchase the building, which he was remodeling. The second floor would have offices, and the third electrically equipped apartments. And the store itself would be remodeled and redecorated. As the Frigidaire dealer, Hall planned to feature this line in his new layout.

C. L. Lewis, who calls his the C. L. Electric Co., last year completed a new concrete building with 130-ft. depth and 270-ft. frontage, in which his complete electrical contracting, motor shop and merchandising business now operates. Far from supply sources he carries a large stock of pole line and interior wiring materials, has a drive-in shop for motor repairs and rebuilding, a separate radio repair and sales shop in the basement, and a well-lighted merchandise sales room with windows that show it off from the street, Separate refrigerator and appliance repair shops are also maintained.

Although he did not merchandise before the war, and is kept busy with large contracts, he rounded out his complete service when he moved into the new place. Ken deLate, former salesman for Idaho Power Co., joined his organization as merchandise man. The company has the G-E franchise and although merchandise shipments were slowed down by the strike last year, as they come in now the store has the location, the parking facilties, and the sales drive to make this part of the business good too.

Across the big Union Pacific railroad yards is a growing business section. There are several electrical dealers located there. Among them is Ad R. Wooley, former Hotpoint man, who with R. H. Wells, Bret Wooley and Claude Bistline, operates the Mountain Electric Co. Building materials restrictions halted Wooley's plans to install a complete Hotpoint kitchen from which to conduct cooking classes and demonstrations continuously. But as much of it as possible is complete and Mrs. Wooley has been conducting demonstrations. Buying resistance is being felt, said Wooley, and building of new homes has come to a stop, but wiring business has been good, merchandise is flowing more freely.

Combining a large shop and warehouse with an attractive store, C. L. Electric Co. has wide window display space and radio repair and parts shop downstairs

No Shortages Ahead in Opportunities To Sell

McAllister McCaughey

Orland and Art Mayer

Although a potential power crisis is in the making in the Pacific Northwest. there will never be a time when the industry won't have to sell itself, its goods, and its services. This idea pretty well sums up the talks and demonstrations put out at the annual spring conference of the Business Development Section, Northwest Electric Light & Power Assn. in Seattle, May 6-10.

The power crisis was referred to in two opening talks by utility executives at the first general session, Thursday morning. Patrick Johnson, vice-president of Puget Sound Power & Light Co., in his welcoming address, pointed out that under present and prospective load conditions during the fall and winter months, the quantity of oil Northwest utilities would have to burn to supplement hydro capacity, might vary from 2,000,000 to 4,000,000 barrels under average to critical water conditions, and it seemed unlikely the oil industry could supply this quantity. He went on to state, however, that those in the sales end of the business had learned to do the job that needed to be done, and that they could be counted on to adjust their activities accordingly.

In his response to this welcoming talk, James H. Polhemus, president of Portland General Electric Co. and president of the association, took a more optimistic viewpoint, pointing out that many things can happen before the situation gets critical. There appears to be a slackening off in the demand for aluminum, he said, and the shutting down of some of the region's aluminum potlines would release both peaking capacity and energy for beneficial use by the general public. With new generating capacity coming in at Grand Coulee in the near future, and with the federal government embarking on the construction of the McNary Dam on the Columbia, prospects do not appear too gloomy. Private and public power distribution agencies contemplate spending $240,000,000 in the ten-year period, 1941-51, and this investment has been well considered. If there are to be any curtailments or cutbacks, they should be looked upon only as a temporary and all parties involved should share the cost and inconveniences. There is no reason why the private companies, the public agencies, and the Bonneville Power Administration, all working together, cannot solve this problem.

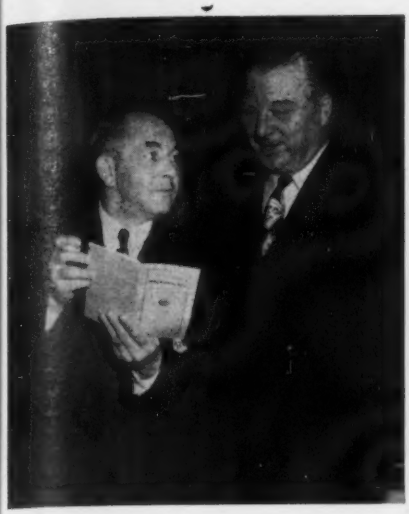
The conference was made up of one day of Agricultural Clinic, more fully reported elsewhere in this issue, one day of bureau and committee meetings, and two days of general sessions. The general sessions, presided over by Henry R. Kruse, Puget Sound Power & Light Co., section chairman, were characterized by top-grade presentations by speakers very largely imported from outside the association territory.

Adequate wiring was represented by the collaborating team of O. C. Small, NEMA, and P. E. McCaughey, National Adequate Wiring Bureau, N.Y., under the title *We've Only Ourselves to Blame.* Small pointed to the tremendous job before the industry to bring the wiring in America's homes, old and new, to a standard that conforms with modern electrical living. Let us now vow never again to allow ourselves to fall back on excuses, but let us recognize the problem and as a coordinated industry, set out to get this job done, he said. McCaughey outlined the program of the National Bureau with emphasis on the certified wiring program, showing through slides, how this program can be put into effect locally, and what sales are available to implement it.

Lighting, the main stay of the industry, was represented in the person of Willard C. Brown, director of engineering, Nela Park, who showed and demonstrated many new sources of incandescent and fluorescent, and in radiation beyond both ends of the visible spectrum. The 40-watt white fluorescent tube now enjoys the largest dollar volume of any single item in the entire lighting line, he said, since it recently passed the sales volume of the 100-watt incandescent lamp, which not long ago succeeded the 60-watt incandescent in public popularity. A new development in industry, he pointed out, is the solarium, for which a 7-kw. unit is now being provided. This unit containing both infrared and ultraviolet "rivals the sun." A problem in solarium installations is to get rid of the radiant heat.

The results of two-years' research on "The Planned Electric Kitchen" in Westinghouse's home economics institute, Mansfield, Ohio, were expounded by Julia Kiene, director of that institute. A problematical family was set up, menus were planned for three weeks, and home economists assigned to work in a prewar "ideal kitchen." Elaborate records were kept of the work involved, and much to the surprise of everyone, the report on the "ideal kitchen" was discouraging. Kitchen after kitchen was then built along more modern lines and the same tests were repeated until today the institute has formulated designs and styles of kitchens far more efficient than those previously accepted as standard. The same kind of tests were run on laundries, and Mrs. Kiene promises that soon Westinghouse will release findings of this research.

Renewed emphasis on agricultural development found its way into the program through a presentation by Roy W. Godley, rural service manager, Edison Electric Institute, N. Y., on a



Bergey Cronholm

Gilbert Platt Olson Alderman

power company's interest in agricultural development. He pointed out reasons why utilities should be interested in a prosperous agriculture and showed ways in which this interest could be made effective. This, he said, depends largely on the needs of agriculture in the area served. The general theme of the talk was that a prosperous agriculture would yield returns to the utility in direct proportion to the degree of its prosperity.

The current interest in measuring public opinion was accentuated by a discussion of opinion measurement techniques, by Dr. Chilton R. Bush, Stanford University. Dr. Bush described two principal methods employed by agencies that sample public opinion through interviews, the quota method and the areal method. The quota method, which employs interviewing a stratified sample, he said, was less accurate than the areal method, which divides the community into geographic districts and interviews at certain intervals within these districts. The problem, he said, is to get management to believe the results that are secured in these opinion measurements and to act on them accordingly. The companies that have used them in designing their advertising or public relations programs have profited by increasing the effectiveness of such programs.

The opening session was enlivened by a recitation of some of the Paul Bunyan legends of the Northwest, by James Stevens, West Coast Lumbermen's Assn.

The second day's general session was designed by the Sales Promotion Bureau of the Business Development Section and conducted by John H. Taylor, B. C. Electric Railway Co., chairman of that bureau. It was pointed up toward cooperation of all branches of the electrical industry, leading off with a discussion of sales training at the retail level, by W. A. Bitcon, B. C. Electric Railway Co., Vancouver.

G. Langtry Bell, Clarkson's, Ltd., Vancouver, represented the dealers of the territory, discussing the responsibility of dealers in the industry, particularly in those territories where utilities have ceased to merchandise. We should take a greater share of advertising and demonstration of new products than formerly and maintain the best possible standard of store service, he said. Above all, we should employ salesmen, recognizing them to be the very essence of our business. On the other side, the rest of the industry should treat the dealer as an important integral part of the process of getting the goods from the manufacturer to the public. Strong local dealer associations are desirable and should be supported by all elements of the industry.

The subject of LP or bottled gas competition was discussed by August Jaeger, Hotpoint Inc., Chicago. The way for the electrical industry to meet this competition, he said, is to do a selling job on customer value and good quality of electrical equipment. He gave a formula of comparative operating data on both electric and gas that would permit close analysis of cost by the application of the rates in any given territory.

A demonstration of FM radio was put on by radio station KRSC, Seattle, and produced by John L. Walker, Westinghouse Electrical Supply Co. Improved reception that can be expected from FM was shown by trying many sound effects, voices and music, in a salute to the electric industry as prepared by that station.

George C. Tenney, Editor of ELECTRICAL WEST, San Francisco, looked into the crystal ball and brought forth the outlook for 1947, coming up with some of the following answers: major appliances will come out in volume but not sufficient to fill the waiting demand; traffic appliances of popular brands will be abundant and a buyer's market may develop sometime in the third quarter; the small motor situation is considerably better and will continue to improve; more home freezers will come out of the factories than will be sold, since these will need aggressive promotion; the buyer is already becoming more selective, the field is wide open to go-getters and it is time to start selling again on the basis of quality and value.

This session was fittingly closed by an inspirational talk on teamwork in the electrical industry, by Kenneth L. Hampton, manager of Valley Electric Supply Co., Fresno, Calif. Hampton brought out the need for coordinated selling from the manufacturer on down to the retail outlet with emphasis on service to the public.

Electrical contractors were represented on the program by R. D. Horning, Seattle Electrical Contractors' Assn., pinch hitting for Paul Heydon, manager of Spokane Chapter of National Electrical Contractors Assn., who was unable to be present for his scheduled talk.

The following brief summary will give an idea as to the trend of discussion in the bureau meetings held on the day preceding the general sessions:

Electric Home Bureau—Earl A. Olson, Idaho Power Co., chairman, took a look at the promotion of water heating, program for meeting the demand for electric house heating, and a discussion of home service activities by company home service directors.

Commercial and Industrial Sales Bureau—D. O. Bergey, Northwestern Electric Co., chairman, heard about the first all-electric laundry in the territory, and explored resistance welding

and its effect on power facilities, high-frequency heating, the application of modern statistical methods to sales effort, and comfortable lighting in industry.

Rural Sales Bureau—A. G. Mayer, The Washington Water Power Co., chairman, used people from the state colleges in the territory to explain some of the new uses of electricity in agriculture, including floor heating in poultry houses, germicidal lamps, pumping molasses when making grass silage, methods of heating farm kitchens, and sprinkler irrigation.

Adequate Wiring Bureau—J. F. McAllister, Utah Power & Light Co., chairman, examined many methods of promotion in different fields, nationally and locally.

Advertising & Publicity Bureau — Ralph Millsap, Portland General Electric Co., chairman, found ways of using visual aids in utility advertising and discussed the place of advertising in the company's organization chart, the programming for publicity, and relationships with the advertising agency.

Farm Clinic

Under the name "Agricultural Clinic," utility representatives, government officials, state college people and others, gathered in Seattle, May 6, to discuss ways of cooperating toward improved farm prosperity and general agricultural development in the region. The meeting was under the sponsorship of Northwest Electric Light & Power Assn., and the chairman of its Rural Electric Sales Bureau, A. G. Mayer, Washington Water Power Co., presided. General theme of the meeting was on the subject of ways in which private business can cooperate with federal and state agencies devoted to agricultural development.

Roy Godley, manager of rural service department, Edison Electric Institute, and Frank G. Mackaness, agricultural consultant, Portland General Electric Co., both emphasized the self interest of the utility companies in a prosperous agriculture. Mackaness explained his company's program consisted of two parts: one, concerning itself with providing proper electric service to the farm, and the other, of furnishing a broader service through a trained farmer who answers questions, or finds the answer pertaining to problems arising on the farms in the company's territory. The importance of utility assistance to 4H Clubs and FFA groups was emphasized in a paper by W. L. Thrailkill, Washington Water Power Co.

The federal government was represented by George Hudson, U. S. Department of Agriculture, Wenatchee, Wash., and Dr. W. R. Van Dersal of the U. S. Soil Conservation Service, Portland. Hudson emphasized the important part occupied by agriculture in the economy of the region, while Dr. Van Dersal showed how the coordinated program of soil conservation would be necessary to save the farm land assets for the future. Each year, he said, 7,000,000 cubic yards of silt are dredged out of the lower Columbia River to keep the channel clear, at a cost of $130,000. In the entire Columbia Basin, each year, 52,000 acre-feet of soil are carried downstream from farm and forest land.

Lewis McMicken

The State College of Washington at Pullman was represented by J. C. Knott, director of Institute of Agricultural Sciences, and Dr. Mark Buchanan, director of Agricultural Experiment Station. Dr. Knott brought out many ways in which other agencies could supplement college agricultural programs. Land classification and its importance to profitable farming, was the subject of Dr. Buchanan's analysis, illustrated by slides showing farms in the five classifications from good to poor. These followed a definable pattern as to size, income and standard of living.

This Agricultural Clinic, the first held in the Pacific Northwest, preceded by one day and was made a part of the annual spring conference of the Business Development Section of the association.

● HALE BROS., San Francisco department store, opened its new exclusive appliance shop on Market Street opposite Grant, on May 19. It contains so many novel display and merchandising ideas that a separate story on it will appear in a forthcoming issue. Hales recently won first prize in a national dealer advertising award, given by Vaculator. Milt Gray, vice-president of Vaculator made the presentation to Lawrence Ward, division sales promotion manager.

Oahu Dealers

At a dinner meeting held May 13 at South Seas, fifty-seven Oahu appliance and radio dealers and retailers adopted the constitution and by-laws of an industry organization to be known as the Appliance and Radio Dealers Association of Oahu.

Officers and directors elected to serve for the current year are: Ralph Miyazono, president; William Nugent, vice-president; L. W. Clifford, secretary; Richard Yamaoka, treasurer. Directors for one-year term are Leo De Roo, S. A. Kirkpatrick, and Henry Deatrick. Directors for two-year term are Henry Tam, Allen Smith, and Ford Denslow. Elected to Chairmanships of standing committees were J. K. Teruya, membership; Virgil Nahl, program and entertainment; Robert Yamanaka, finance, and Warner Hobdy, industry relations.

Keynoting the objectives of the association is the following excerpt from the constitution:

"To coordinate the activities of appliance dealers on Oahu in the interest of: (a) The respective dealers as individuals. (b) The several branches of the appliance industry. (c) The public."

Otto Ludewig, president of the Electrical Appliance Distributors of Hawaii, was guest speaker. Ludewig congratulated the group in behalf of the distributors and assured them of every possible measure of cooperation from the industry group which he heads.

● MONTANA ELECTRIC & APPLIANCE Co., at 112 Central Ave., Great Falls, is now over a year old and is growing steadily in both its merchandising and construction business. It is making a specialty of serving rural customers, both in wiring of farmsteads and in providing them with appliances for the home and farm electrical equipment. Organized by a group of former Montana Power Co. men, it is owned and operated cooperatively by them. Among them are Homer Morton, formerly at Great Falls, Otis Pyatt, formerly at Belt, Eric Hedblom, formerly at Fairfield, Earl Bueling of Sandcoulee, Mike Thorpe of Fort Benton, and Marvin Green. It carries Norge, Admiral and Gibson lines, has a crew of eight electricians, a service man for appliance repairs and installations.

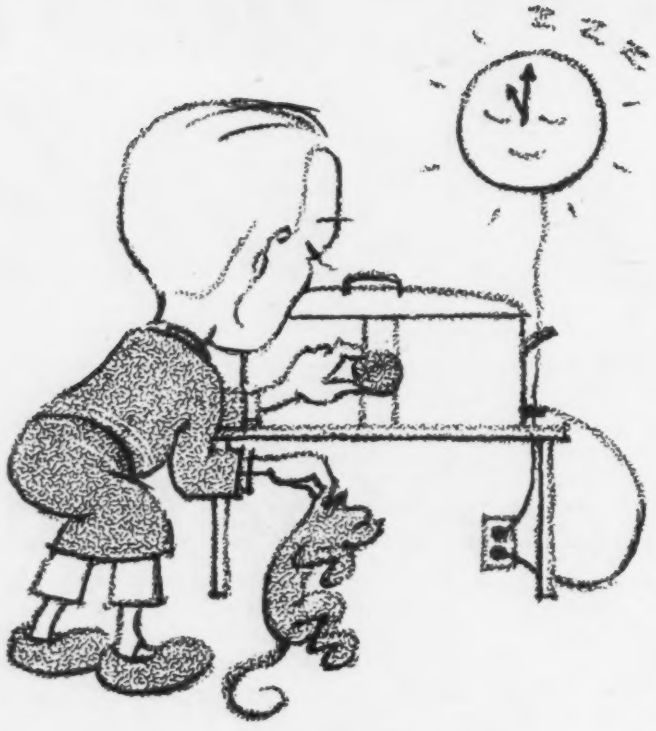
● SHARP ELECTRIC Co. of Salt Lake City now has the opportunity it has awaited for a long time. The furniture store next to it moved around the corner, permitting Vernon Sharp to start the remodeling and enlarging he has been wanting to do.

ELECTRICAL WEST
Sales Guide

FOR THE ELECTRICAL MERCHANT OF THE WEST © June, 1947

Roaster Days are Here Again

They have come back together this year —the warm-weather days and the electric roasters. Many dealers find that the public needs telling what the roaster will do. The rush to buy is over and people want to be sold and that means they have to be told. Electrical men often forget that the values of an appliance, so taken for granted by them, are still unknown to potential buyers. Many a woman, with the money in her purse to buy an appliance, has gone by the window or even come in the store to look and gone out without buying because no one took time to tell her what an electric roaster would do for her. It is even good business to tell the one who comes and buys one without question. It may suggest more uses for the roaster than she had thought about and make her enthusiastic about it.



Cooks the cereal while you sleep

Twenty

every one should

Electric

As expressed once by Kansas City and still

1 **Cooks four things at once**—a roast, two vegetables, potatoes and don't forget the gravy.

2 **Cooks your dinner while you are out** for the afternoon. Gives you more leisure time.

3 **Does not heat up the kitchen** in warm weather. Here is Comfortable Cooking!

4 **Cooks food economically** for two to ten people. Choose the size roaster best suited to your needs.

5 **Ideal for small apartments,** summer cottages, kitchenettes. So compact it can be tucked away in a corner almost anywhere.

6 **A Complete Stove in Itself.** Performs every ordinary cooking operation. Roasts, bakes, fries, steams and stews. Many models have broiler.

7 **Plug in any Electric Outlet**—no special wiring or installation necessary.

8 **Economical**—Cooks a complete meal for 2c. Every family can afford to own this modern cooking appliance.

9 **Unsurpassed for Cooking Flavor.** Retains the delicious natural goodness in foods.

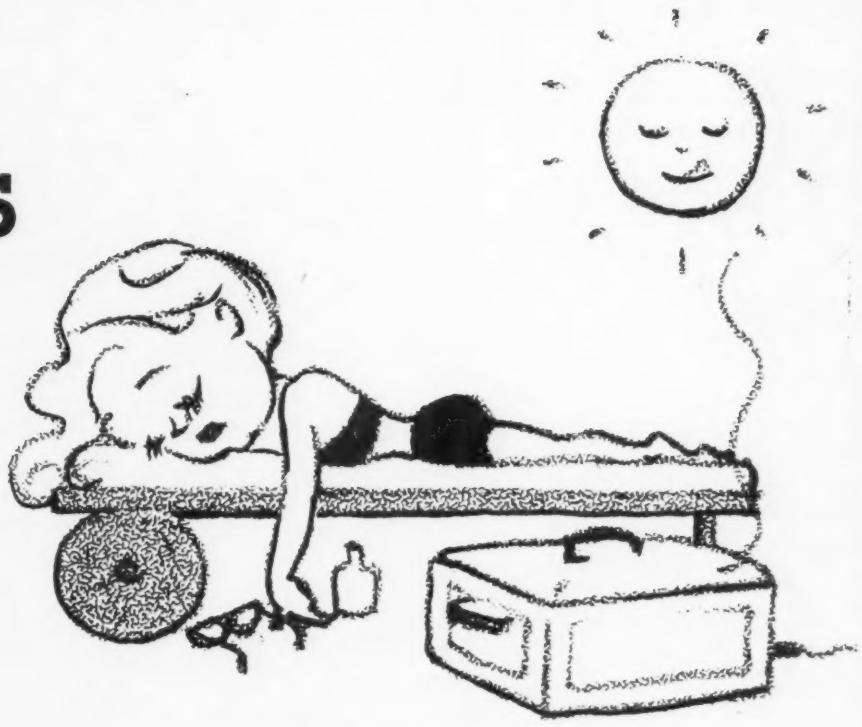
10 **Genuine electric cooking** — makes even tough cuts of meat tender. Saves you money on meat bills.

Reasons

buy and use an

Roaster

the Electric League of
true, only more so



Warm food for the picnic

11 **Clean.** No flame, no matches, no soot to darken walls and curtains. Your kitchen needs less frequent redecorating.

12 **Healthful.** Meats and vegetables are steam-cooked in their own juices. Important minerals and food values are retained.

13 **Easy to Clean.** No scouring of blackened utensils, no scrubbing of grimy pots and pans. Fewer cooking dishes to clean.

14 **Waterless Cooking.** Vital elements are not boiled away, or poured down the sink with excess water. Delicious flavor is sealed in.

15 **Handy for hot meals on picnics.** The roaster is portable and easily carried in a car, and will keep food warm for hours.

16 **An aid to light housekeeping.** Even bachelors can cook appetizing meals with the aid of Dutch Oven Susan!

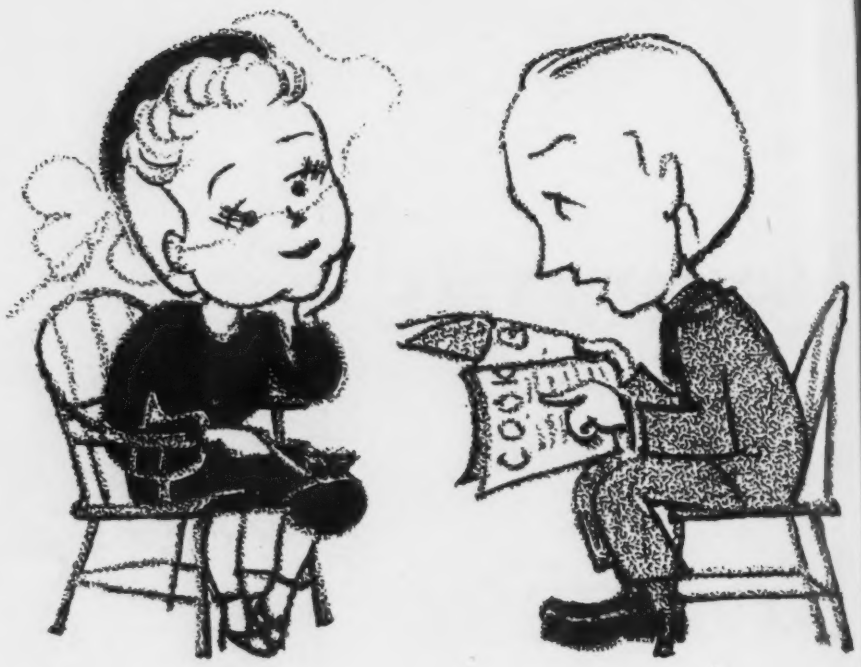
17 **Safe.** A boon in families with small children. No flame, no matches.

18 **Operates** on exactly **the same** principle **as the electric range.** Has all the proven advantages of electric cooking.

19 **Makes an attractive gift.** As a wedding present it is practical, decorative, sure to be appreciated.

20 **Low in Price.** An electric roaster brings you genuine electric cooking at low cost. Inexpensive to buy—inexpensive to own.

Find out what she likes to eat . . .



It is the key to the appeal to use in selling the roaster

Instead of the usual meaningless, "Can I do something for you," start right in by asking "What kind of cooking do you and your family like?" (Even if she is unmarried and is buying for a wedding gift for some girl friend, the question may strike her because it shows interest in **her.** At least it will give you a clue.) Coax **her** to do the talking. Find out what she needs or wants or likes.

In answering the questions you stir up, make your answers simple. Don't be long winded. You wouldn't like listening to yourself either if you are. Find out something about her family, their various tastes—for roasts, or baking, or picnics or special diets. Find out what she likes to serve. Then sell the roaster for its ability to satisfy just exactly those needs or desires.

When you have learned what sort of meals she likes for what size and sort of family, select from the list on the previous page those appeals and uses which will interest her, accomplish what she wants. Show her first how the roaster will cook the kind of food she is interested in. Then add from this list the **plus uses** and **values** that make the roaster the real bargain it is at any price. Tell her the whole story if you can, by leading her to ask for it, then let her make up her mind which model she wants. Nine times out of ten she will select a better model than the one you might have thought she would.

Real salesmanship, selling that is enjoyable, is the kind that generates no complaints to bounce back after the sale is made. To know in advance what might cause such bounces is to be prepared to avoid causing them. A recent check-up by a women's magazine discovered the following things salesmen can watch and sell in a way that will bring only satisfaction and pleasure.

While a roaster will make tough meats tender, be sure to explain that the better the quality of the food put into the roaster, the more delicious the results. A roaster will help the taste of any meats, but it will do its best on better meat.

Make clear to the customer that the broiling unit is extra, if it is. Several women expressed disappointment and claimed they were led to believe they were to get a broiling unit too.

The average woman thinks thermostatic means automatic. Explain that thermostatic control means heat control but that only the fully automatic roaster will turn itself on and off.

Explain the distribution of heat so that there will be no complaint from overdone or underdone foods because wrongly placed. The proper sized pan often has a lot to do with success.

Learn to cook yourself, and you can tell and sell with more conviction.

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RIGHT - - - *from the Start:*

WIDE-AREA, LOW-TEMPERATURE HEATING WHICH ASSURES FREEDOM FROM LIMING AND SCALING, HAS BEEN USED IN EVERY HEATER CLARK HAS BUILT

BLACK HEAT, in electric water heaters, was "new" thirty years ago. Clark pioneered it in their first "Life-Belt" heating element and have used it in every heater they have built.

This gentle heat principle, which prevents liming, scaling and oxidation by spreading the heat in a wide band of low temperature on the outside of the tank, has withstood the acid test of time and tough water conditions. Many of the first Clarks are still in daily service, some in water so tough as to cause other heaters to break down in a short while.

Just a year ago Clark announced another "first"—IONODIC protection against electrolytic corrosion. This remarkable development, employing a magnesium rod with an exclusive metering resistor, enables an ordinary galvanized steel tank to give amazingly long service in highly corrosive water. Men who know will tell you that Clark can be depended upon for the best in electric water heating — FIRST!

A TOASTMASTER *Product*

CLARK

Automatic ELECTRIC WATER HEATERS

McGRAW ELECTRIC COMPANY, CLARK WATER HEATER DIVISION, 5201 W. 65th ST., CHICAGO 38

Northwest Personnel Meeting

Accident prevention and safety, job evaluation and merit rating, employee selection and placement and employee training, were the subjects arousing the greatest interest at the annual spring meeting of the Personnel Section, Northwest Electric Light & Power Assn., Boise, April 23-25. L. W. Nims, Utah Power & Light Co., section chairman, presided during two days of the discussions, while on the third day, given over entirely to exploration of company practices in accident prevention and safety work, Don Prairie, Northwestern Electric Co., chairman of the section's accident prevention committee, presided.

In the safety program attended chiefly by the safety directors of the member companies of the association, discussions were divided into promotion of safety consciousness, inspections, training in safety, and the preparation, scope and uses of reports. Among the findings from these discussions, reported back to the general meeting by Prairie were: first, that the promoting of safety consciousness was the most difficult of the safety director's problems, that inspections should be regular, routine and thorough, that training is a function of supervisors and foremen, and that reporting should be standardized under the ASA method. The latter conclusion was reached after a survey of company methods of reporting industrial injury, by T. W. Lowry, Portland General Electric Co.

A survey of job evaluation, merit rating and attendant practices of member companies, by J. E. Allan, B. C. Electric Railway Co., chairman of the salary standards committee, indicated that written standard practices on salary administration policies are quite general among the companies. The field is a new one, however, to the Pacific Northwest and the practice of applying statistical techniques to the whole field of data has not been generally adopted as yet. The tendency, however, is toward applying scientific statistical methods.

In the matter of selection and placement of the employee, it was also found that several companies were moving toward a more scientific method of selection through testing devices. L. T. Matter, Puget Sound Power & Light Co., chairman of this committee, reported an exhaustive survey of company practices.

The subject of selection was further pursued in a luncheon talk by Eugene Giles, psychologist of Boise Junior College, who displayed and explained many of the standard testing devices now used in industry and for vocational guidance.

Employee training programs, proposed in several companies, have not yet been brought fully into play, it was reported by C. W. Sherman, Puget Sound Power & Light Co., chairman of the training committee. Recent emphasis has been on training linemen because of the shortage of this class of skilled labor in the area. Training of metermen and office workers and accountants has also had attention in a number of companies. Necessity for more training in all fields of utility work, with particular emphasis on those employees meeting the public, was recognized in a resolution urging that more attention be paid to the general subject of training.

A complete survey of the service and benefits offered to employees by the member companies, was reported by R. H. Sessions, Idaho Power Co., chairman of the committee on this subject. This survey in a single report gives the salient facts about each company's group life and disability insurance, retirement income plan, sick leave and vacations-with-pay policies, medical aid and health service, educational and recreational activities and similar benefits. It was found that all companies have substantial benefits for employees, the average cost to the companies running from $35 to $50 per employee per month.

A study of personnel records and the information kept by personnel departments for the use of management was undertaken by J. L. Stirns, Washington Water Power Co., committee chairman. Purpose was to show the way to greater simplification of record keeping.

A feature of the safety meeting was a luncheon talk by Eldon L. Beck, Idaho Power Co., who during the war was loaned to the government as safety director for the atomic research and bomb construction at Los Alomos. Beck told of some of the work there, leading to the construction and trial of the bomb at Alamongardo.

● COMMITTEE to promote a county electrical ordinance was set up at the last meeting of the Central California Chapter, International Assn. of Electrical Inspectors, in Fresno, by L. B. Sterling, chairman. It consists of H. H. Courtright, Pacific Gas and Electric Co., George Bowman, city electrical engineer of Fresno, and L. G. Jeffery, electrical contractor. Bowman led a discussion of the 1947 Code through article 338. T. W. McCloskey, power engineer, PG and E, discussed the differences in motor circuit rules in the code and the California Electrical Safety Orders. Walter Wood, inspector for Visalia, opened discussion of the inspector problems relating to nonmetallic sheathed cable, in which all participated. The next meeting is scheduled for July 12 at San Luis Obispo, with Seth Kenney as chairman.

Nims Sessions Matter Sherman Stirn Prairie Petersen

Electricity is worth waiting for
Picture yourself in your afternoon best, doing the Monday wash with an automatic laundry! Just insert the clothes, flip the switch and electricity does the washing, rinsing and drying automatically. Small wonder, then, that 5,000 new customers in San Diego County have applied for electric service and are waiting for the conveniences of new fully automatic cooking, water heaters, automatic laundry, dish washer, sink, home freezer and other appliances that electricity makes possible.
Going to build?
Apply for your gas and electric service now!
Electricity is worth waiting for
PICTURE yourself cooking the easy, effortless way, with a modern fully automatic electric range. These smokeless, odorless, streamlined ranges take the "chore" out of meal-fixing. They're clean, fast and cool. Thousands of residents throughout San Diego County have applied for electric service because they want the convenience of electric cooking, water heating, laundering, dish washing, garbage disposal, refrigeration, frozen food storage and the host of other modern conveniences which only electricity provides.
"Shortages ar... me ..."
We're installing many more new electric services per month today than we ever thought possible a year ago . . . in fact new services are at an all-time high. It's been done *in spite of* shortages of material, labor and other handicaps.
But this still doesn't meet San Diego's growth . . . and need of new service. There are still regrettable delays. We are doing our best to make
ply for your gas and electric advance as possible, for there's Approximately 5,000 applications for new es right now.
e were prohibited by Federal regulations from ners, other than those connected directly with struction . . . poles, lines, transformers, etc. . . . materials were available, and we had to use material to install priority orders
ourselves with materials gone . . . with new service on hand . . . and unexpect- pplications coming in every day. We have ace V-J Day . . . but shortages of material ept us from catching up with the demand.
dled in turn . . . all other things being **ake that application** as soon as you e service just that much quicker
Reddy Kilowatt
& ELECTRIC COMPANY
ors, most of whom live in California
And WHY some people must wait
Extending electricity to these many new customers requires TIME. All available men and equipment have been pressed into service to speed construction of new electric lines. Augmenting the work of our own line crews, 16 additional private contractor crews are building new lines for us. The new 26-mile line from El Cajon to Descanso, ready in July, is one of several new lines which will bring electricity to scores of rural families for the first time. With our greatly accelerated line construction program, new customers are now being connected at the rate of over 500 a month, reducing the number of applications on file to 4600. As each new service is cut in, this expression is frequently heard: "Now we have electricity: it was worth waiting for!"
SAN DIEGO
Owned by over 12
p... is available and we have caught up with the 5,000 service applications now on hand.
Reddy Kilowatt
Electricity is worth waiting for
PICTURE yourself taking the "makings" for an entire dinner from your home freezer, with no need to run down to the market for meat, vegetables or fresh berries for the shortcake. Small wonder, then, that 5,000 new customers in San Diego County have applied for electric service and are waiting for the conveniences of new fully automatic ranges, water heaters, automatic washers, dishwashers, sinks, home freezers and other appliances that electricity makes possible.

ELECTRICITY IS WORTH WAITING FOR

Extending electrical service to the many new customers in the San Diego area requires TIME. All available men and equipment have been pressed into service to speed this construction.

In the meantime we are telling our waiting applicants, through ads like the above, just what we are doing to speed their service . . . and are reminding them of the incomparable advantages of electricity . . . that "Electricity is worth waiting for".

SAN DIEGO GAS & ELECTRIC COMPANY

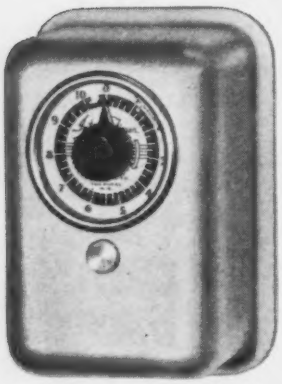
Owned by over 12,000 investors, most of whom live in California

EXTRA PROFITS

with attic and window

fan controls

by **Paragon**



- Two time ranges . . . 0 to 10 hrs.; 0 to 20 hrs.
- Telechron motored . . . quiet; no ticking, self-starting, synchronous.
- Underwriter's approved for 115 V. A.C., ¾ H.P. loads . . . accurate and dependable.
- Easy to install, direct to handy box or surface mount with conduit connection through bottom of timer.

For extra profits this spring and summer, get set to install these new timers, now. They work with any A.C. fan, and the setting may be changed at will without harming the instrument. Timer motor runs only when timer is in operation.

List price only $9.75 F.O.B. Two Rivers . . . an outstanding value.

Order from your jobber now . . . and ask for Sales Aids.

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TWO RIVERS . WISCONSIN

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Paragon Two Rivers WISCONSIN
BUILDERS OF ELECTRICAL EQUIPMENT SINCE 1903

IAEI Panel

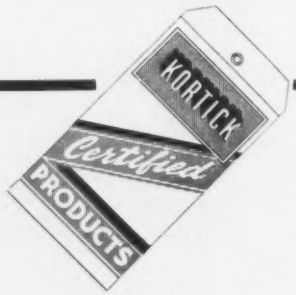
With a panel of "experts" to answer the questions that had been sent in by members before the meeting, the Northern California Chapter, International Assn. of Electrical Inspectors, enjoyed its second Saturday all-day meeting, this time at Santa Cruz, May 17. Chairman R. B. Maxwell, San Jose electrical inspector, called to the "head table" of the city council chamber, Nick Siggins, electrical inspector, San Francisco; Harold Gerber, former chief inspector there and now a consulting electrical engineer; D. H. Hanson, chief inspector, Oakland, and Ben Hill, retired, president of IAEI, as the panel. Also with him was Ken Bliss, Board of Fire Underwriters of the Pacific, and J. L. Ambrosi, Oakland inspector.

Discussion on each question was limited to 15 minutes which proved a good limitation and enabled more questions to be discussed. Among them were questions about spray booths, infrared ovens, uniformity of codes and ordinances, difference in problem and point of view between the inspector and the Division of Industrial Safety of the state; difficulties with the four or six subdivisions of service rules; whether inspection can be retroactive; heat in ballasts of fluorescent fixtures. George Kimball, electrical engineer for the Division of Industrial Safety, announced the meetings now being held to revise the Electrical Safety Orders and bring them up to date. He urged that suggestions be sent in. A committee was appointed to seek ways for more uniformity in ordinances in the area.

At noon Harold Gerber addressed the luncheon, pointing out the changes in the 1947 National Electrical Code in their relation to the Safety Orders. When the meeting reconvened he was unanimously voted an honorary membership in the chapter. Leonard Hobbs, manager, Smoot-Holman Co., lighting fixture manufacturer and member of the RLM Institute, discussed some of the situations the manufacturers must meet today with the design and manufacture of fluorescent equipment. Excerpts of his talk may later be published. The section's next meeting will be in Oakland on July 19.

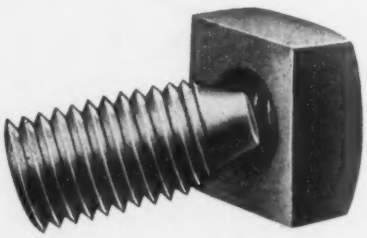
One significant bit of news came in a letter from M. M. Brandon, electrical engineer, Underwriters' Laboratories, who told of the vigorous efforts being made to develop some method of labeling for ready field identification of appliances and equipment inspected and listed by the laboratories, something that this chapter had initiated.

DEPENDABLE POLE LINE CONSTRUCTION *DEMANDS*



Cross Arm Braces

"HANDIDRIVE" Pole Steps



"Handipoint" Bolts and Rods

High Tensile Bolt Guy Clamps

Manufactured and Stocked For Your Convenience On The Pacific Coast By

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SAMSON...THE AUTOMATIC IRON WITH A HIGH IQ*

*INSIDE QUALITY

1000-WATT STEEL-ROCK HEAT UNIT: Embedded . . . safe from air and moisture, quick-heating, current-conserving, and long-lasting.

STEEL SOLE PLATE... harder, smoother, thinner . . . gives better heat distribution.

MAGIC EYE: When this eye winks out you know the iron has reached the temperature you set it for. Shows you, too, how much of the time you are ironing economically on stored heat.

PRECISION THERMOSTAT: Dependable automatic control of iron temperatures actually right at ironing surface.

DUO-DIAL HEAT CONTROL: Measures the heat to suit a particular fabric when ironed at a particular speed . . . the *selective-speed* feature that makes this the supremely safe iron for anybody.

AIR-COOLED PLASTIC HANDLE: Fashioned for a comfortable grip . . . cool to the hand, easy on the wrist.

BUILT-IN CORD: With Rubber Guard. Approved 10,000-cycle.

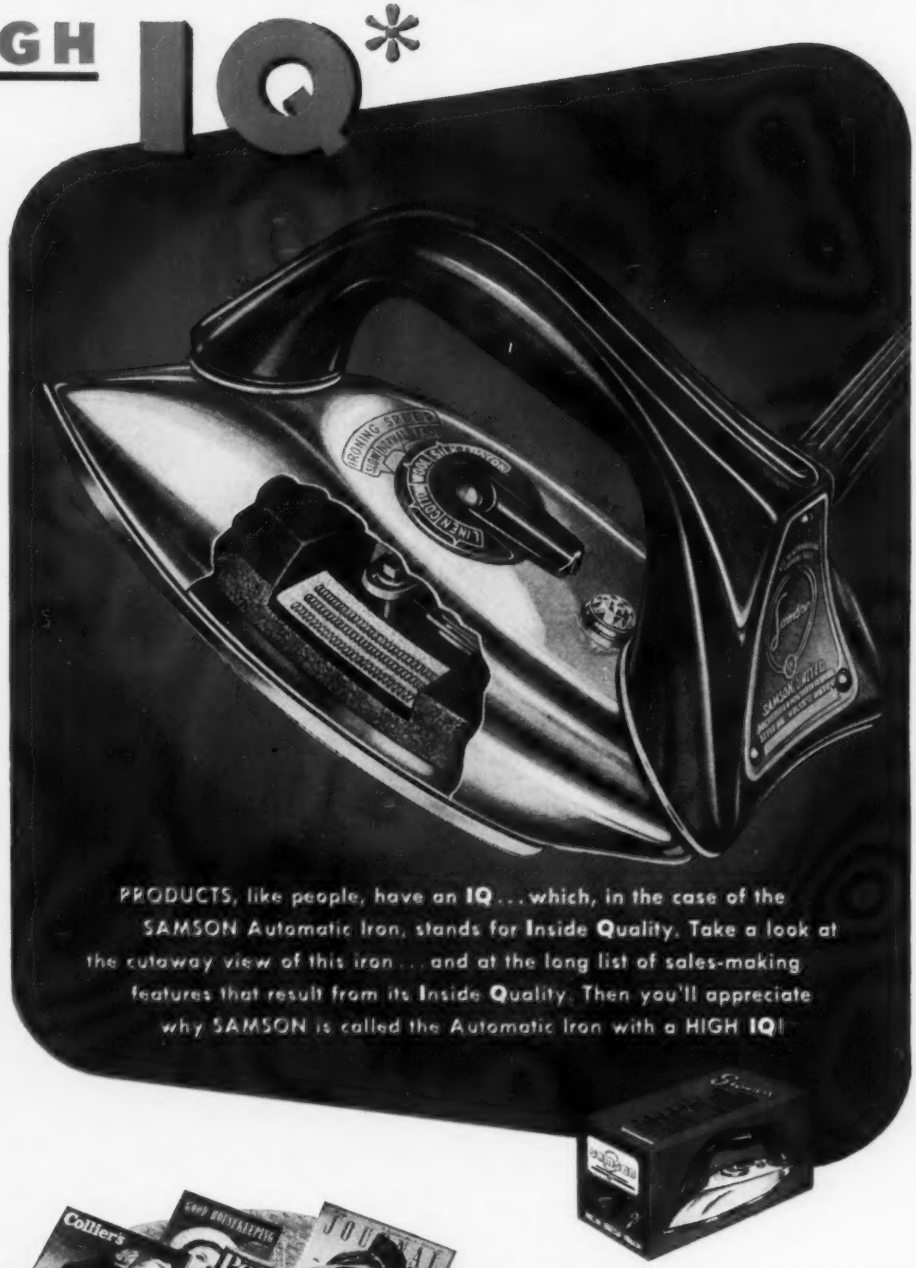
LIGHT WEIGHT (4 lbs.) . . . Perfectly balanced for arm and wrist ease.

TAPERED POINT . . . BEVEL EDGED "BUTTON NOOK" all the way around.

NEVER-CATCH HEEL for unimpeded backstrokes in ironing.

SAFETY-TILT . . . ROCK-TO-REST: An effortless rocking motion stands the iron on its handle, with ALL hot metal off the board . . . and at just the right tilt and firm rest for safety.

STREAMLINE BEAUTY in gleaming chromium plate and black plastics.



PRODUCTS, like people, have an **IQ**...which, in the case of the SAMSON Automatic Iron, stands for **I**nside **Q**uality. Take a look at the cutaway view of this iron . . . and at the long list of sales-making features that result from its **I**nside **Q**uality. Then you'll appreciate why SAMSON is called the Automatic Iron with a HIGH **IQ**!

Advertised to Sell!

Powerful 2-color advertisements, featuring various Samson products, will appear throughout the year in Collier's, Saturday Evening Post, Good Housekeeping, Ladies' Home Journal, and Pathfinder . . . reaching millions of preferred prospects in the small towns as well as the cities. Watch for them—and cash in!

Showboxed to Sell!

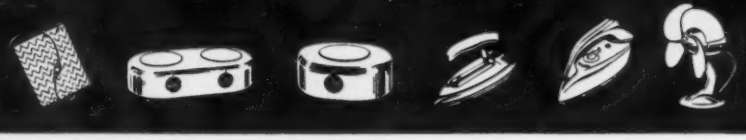
Every Samson SHOWBOX is a complete *merchandising display* that stops 'em, tells 'em, shows 'em and sells 'em! If you want to double your iron sales, be sure to display the colorful Samson Iron SHOWBOXES in your windows and on your counters.

SAMSON UNITED CORPORATION, ROCHESTER 10, N. Y.

Samson United of Canada, Limited, Toronto

Samson ELECTRICAL APPLIANCES

THE "BUY LINE" FOR THE MILLIONS...



ADVANCE Ballasts
Give assurance of continuous performance, for only one out of every ten thousand ADVANCE Ballasts made has ever been returned.

• IMMEDIATE DELIVERY
• EXPANDED PRODUCTION

Greatly increased production facilities enable us to meet the constantly growing demand for ADVANCE Ballasts . . . now made to meet all Fluorescent lighting needs.

60 cycle **50 cycle**

118, 150, 208, 220 and 236 Volt Single and double 15, 20, 30 & 40 Watt High Power Factor & Low Power Factor

New convenient size 32 Watt CIRCLINE BALLAST. A streamlined Ballast at a streamlined price.

Write for Information

ADVANCE TRANSFORMER CO.

1114 W. Catalpa Ave., Chicago 40, Ill., U.S.A.
Cable Address: Adtrans

Safety Orders Revision

Much needed because of the growing disparity between it and the National Electrical Code, the Electrical Safety Orders of the Division of Industrial Safety of the state of California, are now in the process of revision. First of what will be a long series of meetings began last month, May 14-16 in San Francisco, and May 26-28 in Los Angeles, at the state buildings in each place. The two subjects discussed were elevators and cranes and hoists. In July, 7 and 8, at San Francisco and 21 and 22 in Los Angeles, the second group of subjects will be considered, namely garages and hazardous locations.

George E. Kimball, electrical engineer for the division, presides at the meetings, assisted by E. E. Carlton, G. S. Bailey and other division engineers and attorneys. He has issued invitations to all interested groups, associations, interests, employers and manufacturers. Any interested party may submit in writing suggested changes. The changes thus far suggested or found by experience to be needed from the standpoint of safety have been worked into the proposed changes, copies of which are given all who are interested. These are then gone over in detail.

When the hearings are through the engineers of the division will correlate all that are meritorious or necessary and prepare a preprint which will be sent to the entire list of some 400 to 500 interested parties. Before final printing other meetings will be held to eliminate any errors and then submitted to the Industrial Safety Board, which will pass on the final work.

A plea was made at the opening meeting to adopt the National Electrical Code by reference and then supplement it with such additional safety rules as are necessary. It was pointed out, however, that under the character of the laws governing the Division of Industrial Safety and California's codification procedure, this cannot be done. As the hearings proceed, however, it is evident that the Safety Orders and National Code will be very close together in most respects.

● WESTERN members on committees of the National Industrial Service Assn., the organization of motor shops, include W. E. Boyd, Pacific Electric Motor Co., Oakland, on the industrial relations committee, job classification section; T. L. Rosenberg, Oakland, W. M. Hogue, Los Angeles, F. W. Sloan, San Diego, and Carl Lundberg, Seattle, on the membership committee; L. J. Douat, Buzzell Electric Works, San Francisco, the sales survey committee.

Happy Birthday to Us

Perhaps we may be forgiven just a wee bit of pride in the fact that this is the 30th Anniversary of the founding of the Pacific Coast Electrical Association.

The PCEA was created at a meeting at Riverside in 1917—our Annual Convention at Riverside this year is our Thirtieth Birthday Party.

We are a vigorous industry. A Founder's Luncheon at this convention will pay tribute to fifty-one of the men who were at that first meeting 30 years ago. A few of these men are enjoying well-earned retirement, but the majority are still active leaders in the industry's affairs. Yes, we *are* a vigorous industry with a proud past, and a future that is limited only by our own vision and determination.

Your Association has grown with the industry—201 companies and 2490 individuals on the membership list, an Honor Roll of the industry's leaders.

Pacific Coast Electrical Association, Inc.

601 WEST FIFTH STREET
LOS ANGELES 13

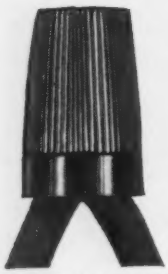
447 SUTTER STREET
SAN FRANCISCO 8

PRICES REDUCED

on IDEAL

Wire-Nuts*

(The Solderless, Tapeless Wire Connectors)



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New Production

Facilities Now

Permit Lower Prices

Greatly increased production has enabled Ideal Industries to cut the manufacturing costs of "Wire-Nuts." In keeping with company policy, the savings are being passed along to you in a sharp price reduction.

These modern wire connectors provide the easiest, safest, most economical method of joining any usual combination of wires. The "Wire-Nut" *screws on—like a nut on a bolt*--no solder, tape, or tools required. Makes a joint that's *better electrically, stronger mechanically,* neater and safer.

MILLIONS IN USE . . . in the manufacture, installation, and repair of electrical appliances, machinery, and devices . . . in new construction, remodeling and rewiring. Ideal "Wire-Nuts" are listed by Underwriters' Laboratories, Inc. —factory tested and inspected.

Ask your electrical wholesaler for new low prices. You'll be amazed at the additional savings now possible by using Ideal "Wire-Nuts."

*Trade Mark Reg. U. S. Pat. Off.

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IDEAL INDUSTRIES, Inc.

Successor to Ideal Commutator Dresser Co.

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Southern California IAEI

With a meeting arranged for Long Beach, May 21, the Southern California Chapter, International Assn. of Electrical Inspectors recalled the last meeting, not yet reported, in which Chairman Kenneth Howard, Southgate inspector, made a motion to present Frank Short, who retired in March from the California Division of Industrial Safety, a suitable gift. The chapter's model ordinance was ready for mimeographing and circulation, it was announced.

Inspector problems discussed included wiring for juke boxes that run from 117-volt controls; germicidal lamp installation, and home owners who roll their own wiring and require as many as six inspection trips and a lot of instruction.

Square D. Co. has invited the group to hold a summer meeting at its new plant and the date set is July 23. A. I. Benedict, San Diego Gas & Electric Co., and Mr. Lewman, Los Angeles Department of Water & Power, talked on power factor correction for gaseous discharge lighting.

● CROWDED out inadvertently from last issue was the identification of the front cover picture as that of the big exposition of the Electrical Maintenance Engineers Assn. of Southern California at the Rodger Young auditorium. It was a full-scale exposition, participated in by most of the leading manufacturers and attended by thousands. At its April meeting the association heard Kenneth Collins of Westinghouse present a talk, *Power Factor, Its Problems and Correction.* For its May 21 meeting it held an old-timers' reunion and gadget night and was entertained by an illustrated talk by W. C. King, of Electric Machinery Mfg. Co., on *Looney Patents.* F. J. Rohring, Southern California Edison Co., was named to fill the vacancy created by the resignation of W. K. Browning from the executive committee, and W. H. Slater, Emsco Derrick & Equipment Co., was made secretary-treasurer. A field trip to a television station is being arranged for a meeting soon.

● DATES for the two annual meetings of the Northwestern and Southwestern Sections, International Assn. of Electrical Inspectors, are announced by Victor H. Tousley, IAEI secretary, as follows: *Northwestern Section,* Hotel Eugene, Eugene, Ore., Sept. 22-24, W. L. Gaffney, secretary, City Hall, Tacoma. *Southwestern Section,* Mission Inn, Riverside, Calif., Sept. 29-30, Oct. 1, H. G. Ufer, secretary, P.O. Box 6360, Metropolitan Station, Los Angeles 55.

ECONOMICAL

Jeffries Transformers

Reasonable in Price
Reliable in Performance

Jeffries large transformers are priced reasonably—and you can save their first cost in a short time by minimizing current losses. When you use a Jeffries transformer, you can provide voltage change at the point desired, without prohibitive expense.

We supply all types and sizes. If not in stock, we build to order in a hurry—a week to 10 days.

Write today for catalog

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CONNECTICUT TELEPHONE & ELECTRIC DIVISION
Hospital Signal Systems — Annunciators — Intercommunication equipment, etc.

LENZ ELECTRIC MFG. CO.
Lead—Braid Covered Cables and Wires—Tinsel and Copper Cordage—Special Cables

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TRICO FUSE MFG. CO.
Fuses, Oilers, Clip Locks and Fuse Pullers

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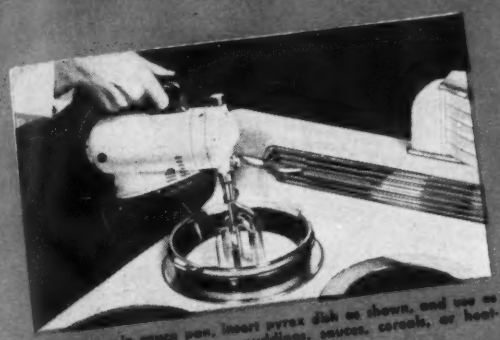
Monarch's ELECTRIC DOUBLE BOILER SAUCE PAN



Place water in sauce pan, insert pyrex dish as shown, and use as double boiler for frostings, puddings, sauces, cereals, or heating baby's milk bottle.

Consider how often a cooked dish should be kept warm at low temperature until ready to serve. Here's the perfect answer: Fill sauce pan half full of water, set in dish as shown, and turn switch to simmer heat — and forget until serving time.

For straight sauce pan operations, it has versatile uses — reheating canned vegetables — roasting meats — quick steaming of fresh fruits and vegetables — baking potatoes — baking puddings and hot desserts.

The Double Boiler Sauce Pan is standard equipment in the Monarch Electric Roaster Range Model F57P.

IN addition to its exclusive built-in surface oven, the Monarch Electric Roaster Range offers another designed-for-use surface unit which makes this quality-packed range a genuine pleasure to sell — a thrilling experience to own and cook with.

A Double Boiler Sauce Pan — with scores of versatile uses as suggested to the left — is built into the cooking top of Monarch's 2-oven Electric Roaster Range — providing an exclusive combination of cooking conveniences which Mrs. Homemaker can find in no other range.

MALLEABLE IRON RANGE COMPANY
3967 LAKE STREET BEAVER DAM, WISCONSIN

MONARCH 3-HEAT DOUBLE BOILER SAUCE PAN

HIGH HEAT for quick steaming or roasting

BOTTOM HEAT for frying or fast browning

SIMMER HEAT for double boiler operations

PLUG THE LEAKS
IN YOUR MOTORS' PERFORMANCE

EQUIP THEM WITH
OHIO
* specially designed
CARBON BRUSHES

It is an established fact that brushes must be engineered to the requirements of the motor. Altitude, underload and overload, atmospheric conditions; all these will retard efficiency of the motor or generator unless the proper application is used. Thousands of industrial concerns have availed themselves of our product and our recommendations. They have learned to depend on our 30 years of Research and Experience in the Laboratory, as well as in the field.

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Los Angeles 13, Cal.

THE OHIO CARBON COMPANY
12508 BEREA RD., CLEVELAND 11, OHIO

Pension Fund

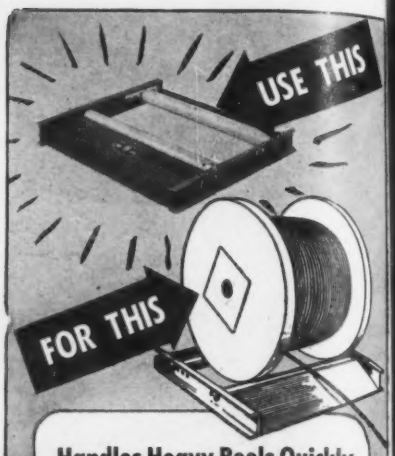
While the pension fund program between the National Electrical Contractors Assn. and the International Brotherhood of Electrical Workers officially began on May 5, there was still some lag in the formation of joint committees and the organization of the machinery for collecting the 1% of labor pay roll from all contractors employing IBEW electricians. Meanwhile also came a ruling including sign electricians and motor shop men in the program, something not originally contemplated by the employers.

The San Francisco association petitioned the National Electrical Benefit Board for a change of procedure to collect on a quarterly rather than a weekly basis and was developing an idea to broaden the program on its own to provide insurance for its members and their families as well as contribute to the pension fund for employees only. A change in the by-laws of the San Francisco association was to be voted upon by the end of May.

Colonel Pettit, chief of the legal division, U.S. Army Corps of Engineers, gave assurance to NECA that contractors regularly contributing to the benefit fund would be reimbursed on cost-plus-fixed-fee contracts upon application. Laurence W. Davis, well known to contractors of the West, general manager of NECA for years, has been appointed executive secretary of the National Electrical Benefit Fund.

● San Diego's 20-year-old electrical ordinance has been brought up to date with the passing of a new one to permit the use of any accepted method covered by the National Code. The ordinance, passed early in April, became effective May 1. Under it, steel conduit is no longer required in new housing. It is still required, however, in all commercial building. All neon signs must be power-factor corrected. The ordinance was drafted after 18 months of study made by a committee composed of representatives from the electrical industry in San Diego, together with the city electrical inspection department.

● Tacoma's new electrical code, now in process of revision, was gone over in detail at the last two meetings of the Tacoma division of the Puget Sound Chapter, International Assn. of Electrical Inspectors, in April and May. W. L. Gaffney, chief inspector, Tacoma, outlined the changes from the previous code at both, and all members entered into the discussion. A new lady member, Virginia Ricono of Lincoln Electric Co., was introduced by Chairman L. B. Garff.



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The Northwest Electric Light & Power Association represents the electrical industry in this region. It is the medium through which utilities, manufacturers, jobbers, dealers and contractors are pooling effective sales promotion and sound engineering developments to maintain the region's lead in electrification.

Their combined effort and cooperation not only improves the industry's service to the public, but in so doing lays the foundation for new profit opportunities in all the industry's branches. In this Association, they have found the way to keep the Northwest in the vanguard of electrical progress, to produce greater prosperity for the region, and to point the way towards new goals in the living standards of the region's people.

NORTHWEST ELECTRIC LIGHT AND POWER ASSOCIATION

OFFICES 802 SPALDING BUILDING • PORTLAND, OREGON

THE MONTH IN BRIEF

Cure No. 1—Less Load

Predictions that the Northwest's potentially critical power situation might be relieved by shutdowns of aluminum potlines were borne out last month with the closing of Reynolds Metal's Longview reduction works, thereby releasing 60,000 kw. of Columbia River power for other uses. Release of 200,000 kw. (out of 600,000 kw. used for aluminum) before fall would dispel shortage possibilities.

Cure No. 2—More Capacity

Relief for Arizona, which is short of power following one of the driest winters in history, is coming from two sources: USBR has borrowed two 40,000-kva. transformers from the War Department for installation at Parker Dam power house to tap the Hoover Dam-Parker 230-kv. transmission tie. Also, a tie is being made to tap the Los Angeles area steam-electric plants.

Who Did Most

By way of controverting popular belief that the federal government was the principal spender of power development funds in the Pacific Northwest, the utility members of the region's power pool have completed a study which shows that their expenditures will total in excess of $246,000,000 for the 1941-51 period. Eight business-managed systems plus the Seattle and Tacoma municipal plants spent $101,000,000 on expansion between 1941 and 1946. For the next five years the budgeted total is $145,000,000.

Pension Plan for Contractors

Some 2,000 electrical contractors and 100,000 IBEW union members became officially partners in a union-contractor sponsored pension scheme May 5. Union members who contribute 60c per month—an amount matched by the employers—will become eligible for retirement benefits of $50 per month at age 65 provided they have maintained membership in the IBEW for 20 years. Larry W. Davis has resigned as general manager of the NECA to take over administration of the fund. On the 15-man administrative board is T. L. Rosenberg, Oakland contractor.

Merging, Merging —

Following stockholder approval of the exchange plan, the long-discussed merger of the Northwestern Electric and Pacific Power & Light companies was accomplished May 31. Paul B. McKee, Pacific president, continues in that office. L. T. Merwin, Northwestern president, and T. E. Roach, Northwestern vice-president and general manager, become vice-presidents of Pacific, the surviving corporation.

One Price That Was Too Low

Divestment plans of Standard Gas & Electric relative to California Oregon Power Co. once again hit a snag last month. For the second time Standard turned down underwriters' bids for the new California Oregon common stock as being too low.

Central Valley

California's Republican Governor, Earl Warren, and the state's Republican Senator, William R. Knowland, both have urged congressional appropriation committees to restore all budgeted funds for the USBR Central Valley project. Both were strongly in favor of federally built transmission lines for marketing Central Valley power. Congress thus far has refused funds for this purpose on the basis of statements that Pacific Gas and Electric Co. facilities were adequate.

Snowman

Snowman Vincent J. Schaefer, the G-E scientist who has produced snowstorms by seeding clouds, explained some of the details during a recent Western visit. To get snow to fall, the cloud must be in a naturally supercooled state; to get appreciable snow on the ground, moisture must be flowing continuously into the cloud region. Dry ice, solid particles, and pressure waves from suddenly expanding gas have all been used successfully to initiate precipitation. Whether eventual ground water distribution over a region could be sufficiently controlled to affect hydro generation is not now known.

Pepco Plan Rejected

Bondholders of the Portland Electric Power Co. have rejected the reorganization plan proposed by the Independent Trustees and approved by SEC. Rejection means that reorganization proceedings must be continued. It required eight years to perfect the defeated plan, which was submitted to 17,000 security holders on Feb. 28. Voting among bondholders was by the monetary amounts represented. They voted $5,412,200 for and $5,387,700 against. Prior preference stockholders voted 35,913 shares for the plan and only 835 against. The vote of first preferred stockholders was 32,231 shares for and 18,390 against.

Footnote on Industry

In population and area, the Western states today are about the size of the United States of 125 years ago. This similarity was noted by F. T. Letchfield of the Wells Fargo bank in discussing industrial growth of the region. Population, he points out, is fundamental to industry; Western isolation was not in itself sufficient to spawn large-scale industry because the efficiency of mass production in more populace areas could overcome the obstacles of distance.

Dark Schoolrooms

School lighting lags far behind accepted practice in other fields. In California alone, 45,000 classrooms need to be relighted. Plans to do something about it are afoot.

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To any portable lamp maker who is employing the new circular fluorescent tube in his product, the vital need for good auxiliary equipment is evident. Specifically, customer satisfaction depends on the BALLAST.

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The word "CERTIFIED" on the ballast you use means that it is built to rigid specifications to assure satisfactory operation of a fluorescent tube in a portable lamp. Nationally famous Electrical Testing Laboratories tests and checks the product against these specifications . . . give it the stamp of approval. And CERTIFIED BALLASTS have long been the accepted standard in commercial and industrial fluorescent lighting. They're your best assurance of customer acceptance and good will.

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Sola Electric Co., 2525 Clybourn Avenue, Chicago 14, Illinois
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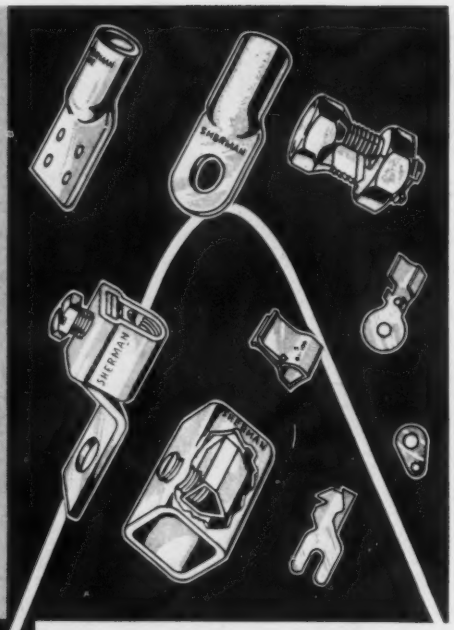

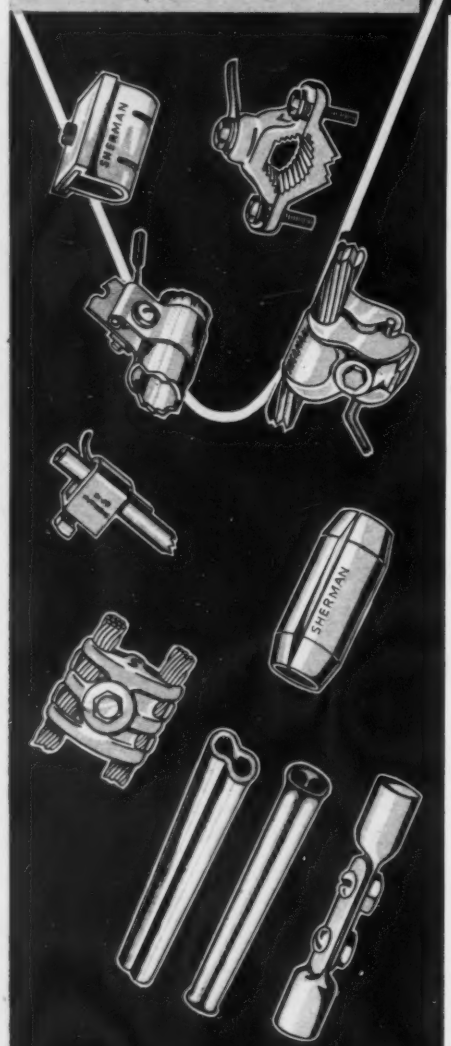

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For fifty years Sherman has specialized in the production of small copper and brass fittings. Through most of that period, Sherman production men have worked with the leading engineers of the Electrical Industry, to solve each new connector problem as it came up.

Today the Sherman line of Electrical Fittings is famous everywhere for its uniform quality and dependability. Engineers know that Sherman Connectors can be relied on to give lasting good service, under the difficult service conditions so often encountered.

Compared with other, more expensive circuit components, a connector is only a small item. Yet in service, the continued reliability of the connector becomes highly essential. For that reason, it pays to specify Sherman Connectors of time-tested quality and dependability.

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THIS MONTH'S NEWS

REDUCED RATES, BUILDING PLANS FOLLOW FRANCHISE

Two immediate results of the twenty-year franchise granted Public Service Co. of Colorado by Denver voters at the recent special election: (1) The company kept faith with "fringe" territory customers by filing new, reduced rate schedules affecting eleven Denver suburban communities; a twelfth, Westwood, which was outside the city limits when the franchise was at issue, enjoys metropolitan electric and gas rates, having been annexed in March. (2) Public Service company submitted for Colorado public utilities commission's approval a program for complete reorganization of its financial structures, and disclosed plans for the expenditure of some $21,000,000 in 1947-48 on plant rehabilitation and new construction.

Part of the franchise contract involved an electric rate reduction approximating 13% for Denver. A verbal promise by company officials was redeemed last month when fringe territory was benefited by sliced schedules commensurate with those made effective in Denver under the new franchise. Annual savings to customers are estimated at about $150,000.

Some $63,000,000 is involved in Public Service Co. of Colorado's refinancing program—$53,000,000 applying to the present capital structure and $10,000,000 of new securities earmarked for improvement and expansion purposes. Authorized capital stock now consists of 50 million dollars, divided into 1¼ million shares of common stock, par value $20; and 250,000 shares of first preferred stock, with par value $100. Previously issued were $40,000,000 in first mortgage bonds and $6,900,000 of debentures. A proposed 40 million dollars in new first mortgage bonds would be dated, June 1, 1947, to mature 20 years later, would replace bonds dated Dec. 1, 1939; and 7 million dollars in convertible debentures to be issued under an indenture would be convertible into common stock. New cumulative preferred stock—160,000 shares—is proposed to yield not more than 4¼%.

The schedule of 1947-48 expenditures will re-equip and reconstruct steam power plants at Lacombe plant (Denver) and the central system in Denver; also finance similar operations at Grand Junction and Alamosa,

at a cost of $3,264,000 this year and $2,072,000 in 1948.

On hydroelectric improvements will be $952,000 in 1947 and $1,309,800 in 1948, spent for refacing Barker Dam (now in process), construction of a 26-mile transmission line from Valmont to Fort Lupton, other transmission lines, and rehabilitation to plants and replacements or repairs to transformers.

Substations and feeder circuits, both within and outside Denver city limits, will be serviced at a cost of more than $1,000,000 this year and nearly $2,000,000 in 1948. Electric distribution feeders, extensions, meters and distribution rebuilds in the Denver area will involve new expenditures of nearly $3,000,000 for the two-year period. Total electric construction disbursements are placed at $6,609,900 in 1947, and $6,695,900 in 1948.

The company is spending $2,172,900 this year, and will spend $3,864,000 next year on its natural gas system. This program includes an intermediate pressure main and a pressure main control station in Denver, gas feeder main enlargements in Denver, downtown heating mains, a new gas transmission line and reconstruction of the distribution system at Grand Junction.

General expenditures for service buildings, office furniture and machines and transportation equipment will approximate $1,500,000 in the two years.

Five-Year Expansion Voted By Idaho Power Co. Stockholders

Idaho Power Co. stockholders, at the company's annual meeting in Augusta, Maine, authorized doubling of the concern's capital stock to provide funds for expansion and construction, President C. J. Strike announced in Boise. Strike explained that the authorization, to be carried out as needed, was made to facilitate a building program expected to cost $30,000,000 during the next five years. At present the corporation has 100,000 shares of preferred stock of $100 par value and 450,000 shares of common stock at $20 par value.

● In Compliance with provisions of the public utility holding company act, Standard Gas & Electric Co. has disposed of its holdings of common stock in the Mountain States Power Co. Disposal of these holdings, comprising 140,614 shares, has resulted in acquisition of approximately 1,600 new common stock holders by Mountain States, according to Z. E. Merrill, president.

Unit No. 2 of the new Gardner Electric plant.

Doubled Capacity • *for Quantity for Quality*

Twice as many transformers—all of them meeting the Gardner standard of quality. That is the goal to be achieved when all five units of the new plant are completed in July. Gardner Electric is growing to meet the expanding needs of the West for power and distribution transformers.

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41PL	7/16	3/16
41B	7/16	7/32
41BPL	7/16	7/32
42	7/16	3/8
42B	7/16	13/32
43	7/16	3/4

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MANUFACTURING CO., INC.

Electrical Division

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POWER COMPANIES PLAN MESA CO-OP PURCHASE

Purchase of the Mesa Electric Co-operative, Phelan, Calif., by California Electric Power and Southern California Edison companies was reported virtually concluded last month. The co-op, about a year old, had not completed any of its planned construction, including 198 miles of distribution line and a $225,000 generating plant.

The purchasers agreed to assume the co-op's total indebtedness to REA, $90,000, and to take over all materials purchased or contracted for by the co-op.

Puget Power Will Acquire Lummi Island Power Holdings

Puget Sound Power & Light Co. soon will take over the holdings of the Lummi Island Power Assn. on Lummi Island off Bellingham, Wash., according to a letter sent out by the board of directors of the association. The company will lay a cable across Hales Pass as quickly as cable can be acquired, the letter says, so power can be brought to the island from the mainland. The association has been operating its own power plant since its formation two years ago, according to John Corcoran, president.

San Jose Group Studying Municipal Utility District

A program for organization of a municipal utility district in San Jose, Calif., was announced recently by a Santa Clara County Committee to Cut Power Costs. The move followed completion of a study of electric power in the area by the Bureau of Reclamation at the request of the San Jose Consumers Cooperative Assn. A minimum reduction of 20 to 30% in power rates would be possible, it was stated.

Central Valley power would be obtained through a 35-mile interconnection from a Tracy substation.

● REA has approved the formation of NYCO Electric Cooperative Inc., of Salome, Ariz., and granted the corporation an initial loan of $298,000. Claude Wickard, REA administrator, says the loan will finance the purchase and rehabilitation of three miles of electric line serving 50 rural customers which is now the property of Sheffler Bros., Salome. It also will finance the purchase of 15 miles of line, serving 330 customers from the Parker Electric Supply Co., Parker, Ariz.

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F. H. A. loans are readily available to aid in the purchase of existing homes or in the construction of new ones. You can buy or build a home and pay for it in small monthly installments like rent. For example, a 20-year loan of $6000 would cost about $49.56 per month, including real estate taxes, insurance, principal and interest.

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OUR TEACHERS—

They Need The Help Of Business Now

THIS is an appeal to raise school teachers salaries—fast. Such appeals are commonly addressed, rather vaguely, to the conscience of the community. This one is not. It is addressed directly to the business community, and to its hard core of common sense.

As a whole, the school teachers of the nation are taking an economic beating. So, too, are their close associates and co-workers, the librarians. In purchasing power, public school teachers salaries, after taxes, average about 20 percent less than they did eight years ago. Beginning salaries of librarians, always low, have fallen behind an equal amount in purchasing power. College and university teachers are not much better off. The pressure is particularly heavy on those in the lower ranks. As a group, teachers and librarians are close to the bottom of the economic heap.

Unless this situation is remedied promptly, it is confidently to be expected that:

1. The more competent teachers will continue to desert our schools in droves, and our libraries will remain inadequately staffed. More than 350,000 teachers — many of them the very able ones—have left the public school teaching staff of about 900,000 in the last six years. More than 100,000 of the replacements are "substandard." They cannot meet the minimum educational requirements of their jobs which, by admission of the profession itself, are none too high.

2. Those who remain will be organized increasingly into economic pressure groups. Teachers strikes and the rapid growth of unionism among teachers at present clearly indicate what is in store.

Many business men are so deeply disturbed by the resort to the strike weapon by some teachers to enforce their salary demands that their sympathy for the general plight of our teachers tends to be dulled. Such an attitude is understandable. It avails nothing, however, in eliminating the crisis in education caused largely by teachers salary troubles.

The crisis in education is a crisis for the nation as a whole. The work of our schools, colleges and libraries is such that its deterioration means deterioration of the nation. However, the salary crisis in education is in special measure a crisis for the business community. That community has a special stake in having a well-educated and well-disposed constituency.

Education and Unionism

There may be room for disagreement as to whether teachers should organize themselves in trade unions, and follow trade union tactics. However, there is no conceivable room for disagreement as to whether organization of teachers into a fighting economic pressure group under the lash of a teachers salary crisis would be a body blow to business. Among many teachers it would foster an abiding hostility to the institution of business which, occupying a key position in the life of the community, had not done its utmost to make such unionization unnecessary by taking a lead in relieving the teachers salary crisis.

In our work of publishing technical periodicals and text books, we at McGraw-Hill meet and come to know many teachers and librarians. We know that, as a group, they have little appetite for participation in militant economic pressure groups. They are far more interested in making a militant assault on ignorance and prejudice through concentration on their professional work. If, through neglect of their economic needs by the business community, they feel forced to resort to trade union organization and tactics, the teachers and librarians can be expected to have an abiding re-

sentment toward the institution of business. That resentment will, in turn, be communicated in no small measure to the coming generation. Such is the nature of the educational process.

The crisis in education is not, of course, exclusively a matter of salaries. Unsatisfactory working conditions also play a part. Many schools are dilapidated and terribly overcrowded. So are some libraries. Some small-town school boards oppressively insist that the school teachers be the paragons of piety the board members wish they were themselves. Protection of a proper degree of academic freedom is sometimes missing. The teacher is rarely accorded a prestige comparable to the importance of the job. Elements such as these aggravate the crisis in education. But the first and absolutely essential step toward surmounting the crisis is to provide tolerable salaries.

Because of the enormous diversity of local conditions affecting teachers and librarians salaries, no general rule for emergency action would fit all cases. From state to state, average yearly expenditures on education in 1940 varied all the way from about $30 per pupil to about $150. Some states, like Nebraska, finance their schools almost exclusively from local taxes. Others, like Delaware, rely almost entirely on state taxes. Some states and communities have already acted to meet the salary crisis. Others have not. Variations such as these limit any generalization.

Guide for Emergency Action

But as a general proposition it can be safely said that the minimum requirements of the emergency will not have been met so long as the salaries of class room teachers and junior members of college faculties and library staffs have not been increased by the amount necessary to keep them abreast of the increase of about 50 percent in the cost of living since 1939. In many cases, a temporary cost of living adjustment might prove the best way to handle the problem.

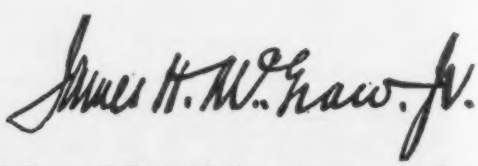
This suggestion, let it be repeated, is not offered as a solution of the salary problem, but as a start. With their salaries increased enough to meet the increased cost of living, the teaching and library groups as a whole would still have cause to envy the current economic position of industrial workers. Since 1939, the average of weekly earnings of industrial workers after taxes, has outstripped the rise in the cost of living by about 21 percent.

However, a start and an absolutely essential start would be made toward giving America the sort of educational system it must have not only to fulfill its ideals but holds its own in this highly competitive world. We worry, and I think rightly, about having the free world engulfed by Russian Communism. According to the best figures available, the U.S.S.R. is spending about twice as large a share of its total national income for education as we are. The figures compared include our expenditures for both public and private education. That comparison is really something to worry about.

States Should Take Lead

In dealing with the salary crisis it is up to the teachers to display a maturity and integrity worthy of their profession. Teachers have many employment advantages, such as long vacations. They should not slur them over in making comparisons of their annual incomes. Also employment in teaching and libraries has been notably stable. Teachers and librarians should not ignore that fact in comparing their position with those whose employment has been far less steady.

At the same time, the great fiscal difficulties involved in solving the crisis in teachers and librarians salaries must not be used as an excuse for postponing effective action. The states are better equipped financially and otherwise to take such action than is the federal government and, with the localities directly involved, should take the lead. If the price of effective action is a heavier tax burden for communities already too heavily burdened that price must be paid. The crisis presents a major emergency. To handle it as anything less is to court irreparable damage to the nation as a whole, and a special measure of damage to business as well. The intelligent self-interest of business requires that it leave nothing undone to meet and master the crisis in education.



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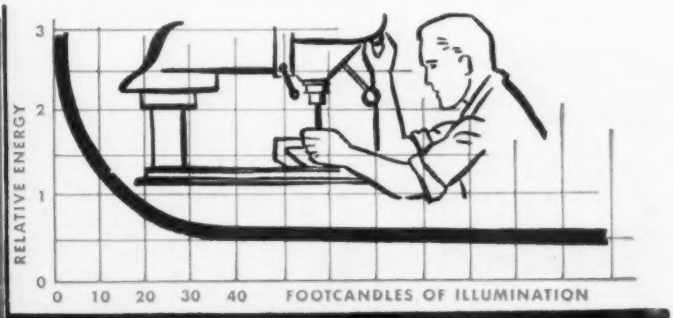
Here are the Authorities' Answers to "What are the FACTS?"



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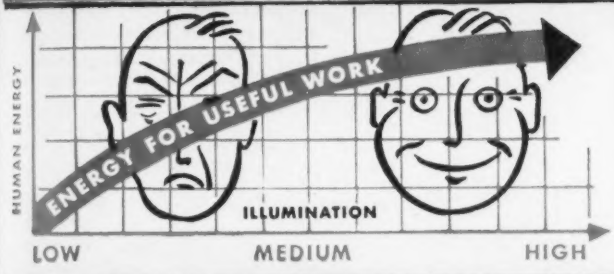

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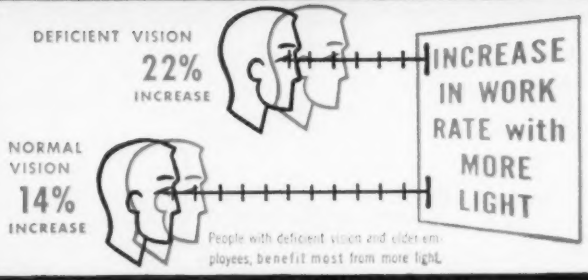

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Although everyone agrees that light is important to safety . . . the facts are that as much as 15% to 25% of all industrial accidents are still due to poor lighting! ①

Why? The answer must be that not all of the factors of good lighting for safety are fully understood. Those who agree in principle that "*you can't have safety without light*" must, therefore, be simply unaware of the degree to which inadequate illumination affects the accident rate!

There are three basic reasons why light is one of the most important single factors in safety. These are:

1 Lighting increases seeing speed by as much as four times ② . . . thus permitting the proper physical response for accident avoidance. In one reported case, an increase in illumination resulted in a nearly 54% decrease in frequency of minor accidents! ③

2 Lighting lessens fatigue ② . . . thus assuring sustained alertness essential to accident prevention. This is well evidenced in the experience of one plant where, after re-lighting, the end of a 10-hour day found workers more spirited than formerly after an 8-hour day! ③

3 Light compensates for visual deficiencies ② . . . thus minimizing a major accident potential, existing in the fact that 39% of workers above the 30-year age group have subnormal vision; that 82% of older employees lose visual acuity — more light keeps them safely on the job; ④ lengthens older employees' years of service.

Certainly, these are sound reasons for looking to *your* plant lighting . . . for planning a system that insures *better safety through better seeing.* Four *free* reports have been compiled by Benjamin Electric that will help you materially in accomplishing this aim. These are also available to other executives in your organization, as an aid in considering all phases of Lighting — how it can best be employed as a means of increasing not only safety, but employee relations, production, PROFITS. Write for all four reports today, to Dept. M, Benjamin Electric Mfg. Co.

(1) National Safety Council
(2) American Recommended Practice of Industrial Lighting
(3) Illuminating Engineering Society, "Value of Good Lighting in War Production"
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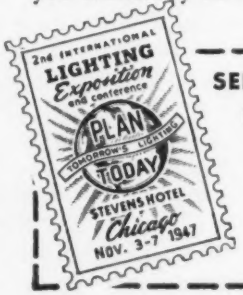

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THIRD STEP OF ROSS DAM APPROVED AT SEATTLE

Seattle City Light will proceed immediately with construction of the third unit of Ross Dam, hydroelectric project on the Skagit River. The new unit will bring the structure to full 540-ft. height to provide 1,400,000-acre-ft. storage. Work now under way and scheduled for completion this summer will bring the height to 475 ft., with 676,000 acre-ft. storage.

In urging uninterrupted construction, City Light Superintendent E. R. Hoffman pointed out that present hydro capacity is 222,000 kw., that maximum load last winter was 247,000 kw., but next winter is expected to be 270,000 kw. Utilization of the city's steam power (about 38,000 kw.) is costly and fuel difficult to get, he said.

The city expects to negotiate a contract with General Construction Co. of Seattle and associates, now working on the dam. No power will be generated until completion of the third step in about two years.

Aid in Curbing Vandalism Asked by Bonneville

With some 490 insulators on the Bonneville power system damaged by rifle fire in ten months, resulting in power outages amounting to more than 77 hours, S. E. Schultz, BPA chief engineer, has addressed an appeal to school superintendents of the Pacific Northwest, asking their assistance in stopping such vandalism.

"The situation has become so serious that it has been necessary to ask the FBI to assist us in apprehending persons involved in the shootings," Schultz said. "Damage has been so extensive and the cost so great, not only to the government but to industry because of enforced shutdowns due to power failure, that we have been forced to take drastic action."

● CONTRACT for the first penstock at Bridge River, B.C. Electric's hydro development 130 miles northeast of Vancouver, was awarded to Vancouver Iron Works Ltd., for approximately $330,000. Just over six feet in diameter, the welded-steel pipe will be 2,400 ft. long and will carry water from the tunnel through Mission Mountain down the steep slope to the generating plant on Seton Lake.

● TACOMA (Wash.) City Council has appropriated $47,000 to convert the city's electric steam plant No. 2 to oil firing. The conversion, expected to be completed by December, will permit the burning of oil, coal or both.

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CITY OF TACOMA TO STUDY COWLITZ RIVER POWER SITES

Immediate investigation of power sites on the Cowlitz River has been recommended to the city of Tacoma, Wash., by the W. C. Gilman Co. of New York in a general survey submitted to the city council by Public Utilities Commissioner C. A. Erdahl. Frank Ward, City Light superintendent, concurred in the recommendation. The city owns power sites on the river at Mayfield and Mossy Rock.

The report says that present generating facilities are adequate for present peak load requirements under conditions of normal stream flow. "We estimate that the continued growth in load will require at least 50,000 kw. in added system capacity by 1950 and a further increase of from 50,000 to 100,000 kw. by 1960," the report declared.

It was suggested that additional power for the city might also be obtained from the Bonneville Power Administration or by steam generation, but that a new hydroelectric development appeared the most economical.

An analysis of characteristics of residential customers indicates a large percentage of unusually high use customers, says the report, over two-thirds of which have a very uniform use throughout the entire year.

Both house heating customers (probably about 10% of the total residential customers) and small-use residential customers are producing a lower percentage of return on the investment necessary to serve them than customers of other classifications, says the report, which recommends a rate revision to include a second step of 30 kwh. a month at 2c a kwh. (at present the rate is 4½c for the first 20 kw., dropping to 1c for the next 400 kw.)

The report recommends that the city council authorize an issue of about $32,000,000 revenue bonds with a maximum maturity of 30 years to be sold as needed to provide, with the cash available from operations, the funds required for construction and for refunding of all the several series of revenue bonds now outstanding as soon as each of the present series becomes callable. By Jan. 1, 1955, says the report, this new issue of bonds then would be a first lien on earnings.

The proposal has led to objections by Milo Moore, state director of fisheries, and Don Clarke, state director of game. More than 75% of the spawning ground of the spring chinook salmon and steelhead trout would be affected, these officials say, while the development also might destroy the smelt run in the river.

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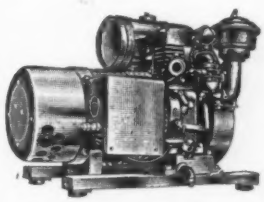

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L. A. INSTALLING RECORDERS FOR OWENS VALLEY RUNOFF

To gain increased accuracy in predicting Owens Valley runoff, Los Angeles Department of Water & Power has installed precipitation and temperature recorders in four snow basins in the Sierra Nevada water shed supplying Los Angeles.

Forecasts are now made on the basis of annual snowfall measurements over 12 courses which have been surveyed twice each year since 1926, in February and March. Measurements are made at different elevations on each course, varying from 8,300 to 11,000 ft. above sea level.

Accurate predictions of water runoff from the High Sierra snows are important to the department's electric system because operation of the Los Angeles aqueduct hydroelectric plants is measurably affected by the data received from snow surveys. Forecasts of the amount of runoff and the time it will occur assist in the preparation of load schedules in advance of the actual demand.

Eighty per cent of the Los Angeles water supply comes from the Owens Lake area.

The primary purpose of the four recorders is to give a continuous record of precipitation and temperature in the area during the runoff season, April to October. The machines also will be operated throughout the year, however, since winter temperatures make up a valuable part of the hydrographic division's records.

The surveys are not made to determine the exact amount of snow that has fallen, but the water content of the snow, a highly variable factor. Yearly water content on one course, for instance, has been found to range from 15.54 to 74.4 in.

The recorders are manufactured by Stevens Instruments, Portland, Ore. Temperature variations from 20 degrees below to 100 degrees above zero can be recorded.

● A STATE-WIDE manufacturers' directory will be published by the California Manufacturers, Assn. Listings are free and the directory will be available at a nominal price, C.M.A. headquarters reported. Information may be secured from the association at either 220 Montgomery St., San Francisco 4, or 1151 S. Broadway, Los Angeles 15.

● A 750-kw. DIESEL-ELECTRIC generating unit has been ordered by Utah Power & Light Co. for its Vernal, Utah, plant. The new unit will increase the plant's generating capacity by 54%.

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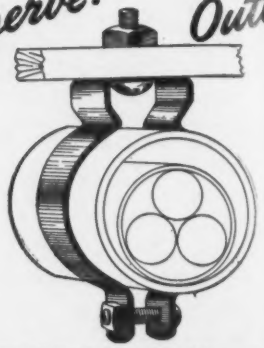

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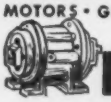

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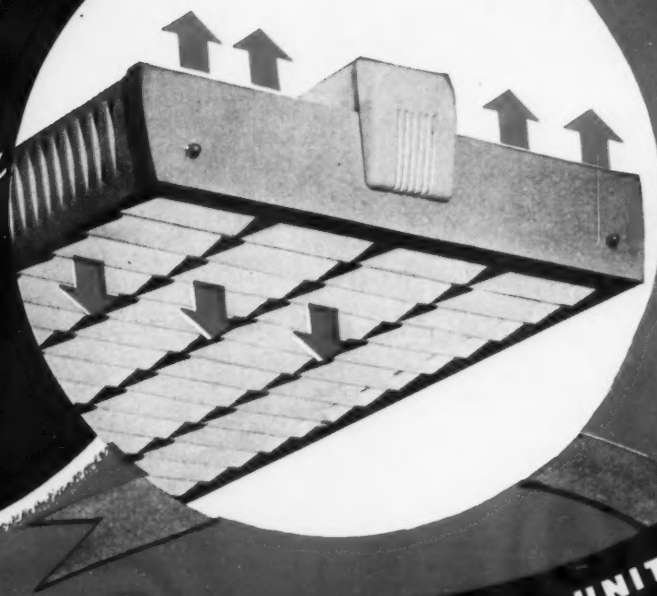

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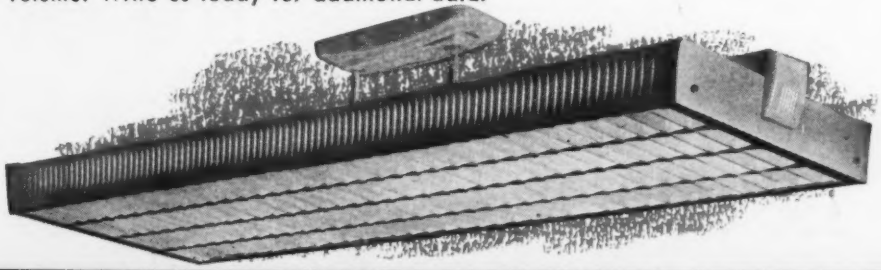

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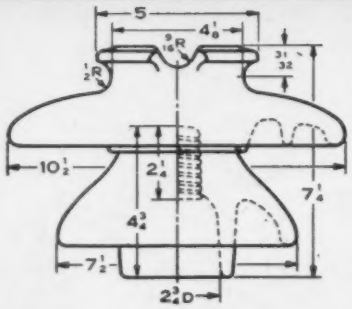

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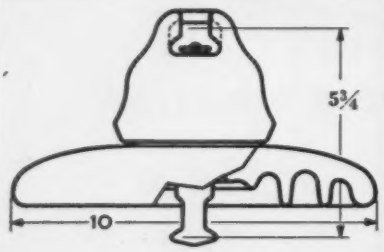

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FINAL 1947 WATER FORECASTS ISSUED BY FEDERAL BODIES

Final snow surveys for 1947, made throughout the West as of May 1, showed insignificant changes in the water-supply forecast reported in these pages last month. As announced by the Division of Irrigation and Water Conservation, U.S. Soil Conservation Service, the state-by-state prospects still indicate serious shortages in the Southwest but a progressive improvement from south to north. The state-by-state forecast follows:

Arizona: No change from the April forecast. An acute water shortage exists throughout the major irrigated areas.

California: Owing to a state-wide deficiency of April precipitation, the stream flow forecast has been reduced from 54% of normal to 49%. However, while some local irrigation shortages may occur, it is still expected that, with careful use, most areas in the Central Valley will have enough water for normal irrigation needs, while such shortages as may curtail hydroelectric power development can be made up by steam generation. Sierra reservoirs are fairly well filled.

Colorado: South Platte prospects now about 10% better. Reservoir storage above last year. Clear Creek and South Platte above Denver will have a summer runoff about 50% above normal. Rio Grande and Arkansas River conditions are unchanged, except that April precipitation has improved the soil moisture conditions in San Luis Valley. Colorado River tributaries: Yampa, White and Colorado itself will discharge about 10% more water than was indicated April 1; Animas and San Miguel about 10 to 15% less; Roaring Fork, Gunnison, San Juan and Dolores unchanged.

Idaho: April forecasts unchanged. Normal or better than normal runoff will occur in all drainage basins except those in the southwestern portion.

Montana: Better than normal runoff is still expected on both sides of the Continental Divide. Reservoir filling has shown some variation and water in storage is slightly below that of last year, but soil-moisture conditions are highly satisfactory.

Nevada: Previous forecast of short runoff is unchanged, and the chief encouraging factor is still the fairly satisfactory condition of reservoir storage.

New Mexico: No snow measurements were made May 1, but Rio Grande flow at Otowi Bridge is now expected to be only 65% of normal, while Taos River flow will not exceed normal. Elsewhere no change is reported, and supplies generally will be subnormal.

Oregon: Immaterial changes are made in the April forecasts, which

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showed 72% of irrigated lands had prospects of good to fair supplies. These areas are chiefly served from stored water. Most lands dependent upon unregulated stream flow will have deficient to only fair supplies.

Utah: No material change in April forecast, which reported prospects of satisfactory irrigation supplies for most areas, with the possible exception of Price River basin.

Washington: Normal or better than normal supplies are still generally in prospect for both irrigation and power.

Wyoming: Discharge will be above average, and generally a little better than previously forecast, except for the Powell area on Shoshone River. Buffalo Bill reservoir storage is about one-fourth less than last year, and other storages are down slightly. Soil moisture conditions are favorable.

British Columbia: The outlook is unchanged, with above-normal runoff indicated for Columbia and Kootenai rivers and average runoff to Okanogan Lake.

Municipal Light Employees Quit Jobs in Wage Dispute

Eleven employees of the Ellensburg, Wash., municipal light department walked off their jobs May 15 when the city council refused to grant all of them wage increases of $25 a month.

One lineman and two meter readers refused to join the walkout and Light Superintendent Lewis Ambrose said he had been able to hire one ground man and had a sufficient crew to handle emergency situations.

While the municipal hydro plant is idle, the city is getting its entire power supply from the Bonneville Power Administration. Ambrose was advertising for linemen at a wage of $275 a month, $25 over the previous wage scale, and for operators at $200 a month, a $5 increase. Operators get living quarters without charge.

The city administration had offered the $25 increase to all except the plant operators.

● WAGE raises of 12½c across the board for 700 San Diego electrical workers have been granted following the conclusion in April of four months of negotiations between the National Electrical Contractors' Assn. and the AFL Electrical Workers Local B-569. Under the new agreement, journeymen wiremen will receive $2.12 an hour. It was further stipulated that if current negotiations for Los Angeles electrical workers should result in a higher wage rate than above wages, the Los Angeles scale would be adopted and made effective at the date of its acceptance.

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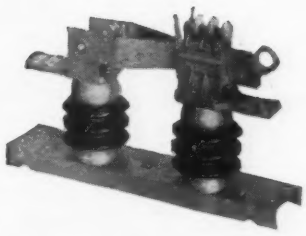

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NEWS ABOUT PEOPLE

Pacific Gas and Electric Makes Personnel Changes

William G. B. Euler, vice-president in charge of operations, Pacific Gas and Electric Co., was appointed vice-president and general manager, effective July 1, in one of several personnel changes announced late last month by President James B. Black.

Euler succeeds A. Emory Wishon, made executive vice-president to assist the president and direct the company's $300,000,000 expansion program.

Black also announced retirement of R. E. Fisher, vice-president in charge of public relations and sales, and the promotion to vice-president of four executives—Norman R. Sutherland, D. D. Smalley, James S. Moulton and I. C. Steele.

Sutherland, manager of the San Francisco division since 1945, succeeds Fisher. Smalley, who takes the post of vice-president in charge of operations, has been engineer of electric operations for a year; previously was general superintendent of San Joaquin and Midland counties properties.

Moulton retains the post of executive engineer and Steele that of chief engineer.

Fisher retires after 36 years of service, 25 as vice-president. Long prominant in civic affairs, he is currently chairman of the Bay Area Council and northern California chairman of the C.E.D.

● NOMINATION of William E. Warne of California as assistant secretary of the Interior was sent to the Senate last month. Warner W. Gardner has resigned from that post effective July 1. Warne, now assistant commissioner of reclamation, entered the bureau in 1935 as editorial assistant to the late Dr. Elwood Mead. Project reports on the Missouri River, Colorado River and Columbia River basins have been made under his direction.

● CLARENCE E. MEYERDICK has been appointed superintendent of public utilities for Roseville, Calif., succeeding J. E. RILEY who resigned to return to a position as superintendent of the municipal water department. Meyerdick formerly held the combined posts of assistant superintendent of streets and city engineer. His appointment is temporary pending a civil service examination.

● J. C. HICKS, formerly of Sylvania's California division, has been appointed Southwestern division manager with headquarters in Kansas City.

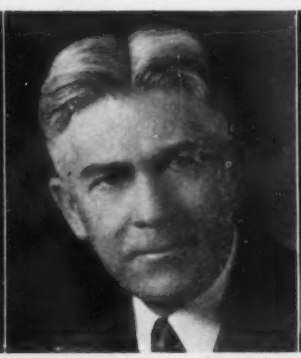
Wishon

Euler

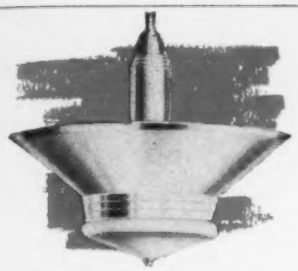
Smalley

Sutherland

Steele



Moulton



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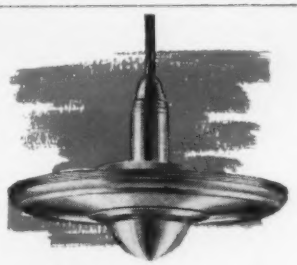
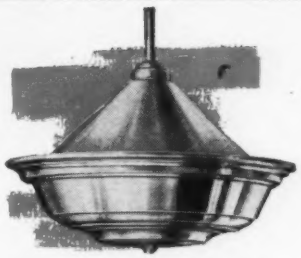


WINDSOR—Provides wide light-distribution of Indirect Lighting with pleasant bottom light-spill. Excellent for low-ceilings. (2-sizes.)



OPTILUX—Enclosed Indirect with low-brightness glass reflector-cover. Ideal for Schools and Hospitals. (2-sizes.)

NOW A Definite Line of Guth INCANDESCENTS

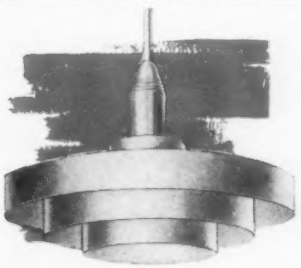
Although Fluorescent Lighting makes up by far the major portion of our business today, we are nevertheless, producing a great many Incandescent Lighting Fixtures as well. The demand for Incandescent Fixtures is still excellent. Illustrated here are a few of the many types of GUTH Incandescent Fixtures included in the complete line. Our Catalog 44-A illustrates and describes a wide variety of types and sizes. Our current policy is to confine production strictly to the items shown in Catalog 44-A. We are not producing any other types shown in earlier catalogs. By so doing, we can assure you of better production and delivery schedules than would otherwise be possible. Write for Catalog 44-A today. It includes the full line of present day GUTH Fixtures . . . both Fluorescent and Incandescent.

OUR 45th ANNIVERSARY YEAR

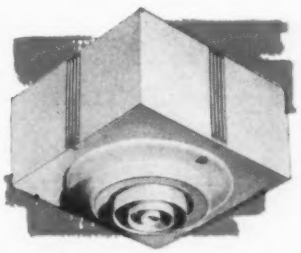
THE EDWIN F. GUTH CO.
ST. LOUIS

Leaders in Lighting Since 1902

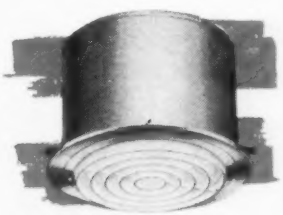
Guth



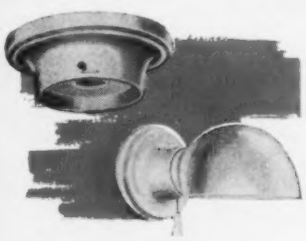
"THREE RING SB"—Totally Indirect Luminaire for Silver Bowl Lamps affords good maintenance. (2 sizes in 2 types.)



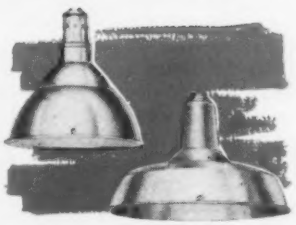
HYLITERS—Recessed and Surface types for Projector Lamps (PAR 38). Can be used as individual units, or in conjunction with our Fluorescent types.



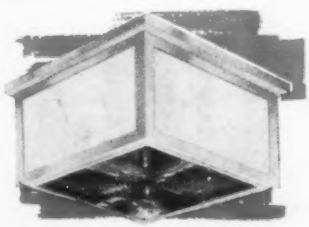
RECESSED UNITS—With Genuine Alzak reflector. In 2 sizes. Various bottoms include: Open, flat sanded-glass, Louvre Lens, Concentric Louvres, Wire Guard, etc.



AGLITES AND FLANGES—Aglites are high quality all-around utility units; Flanges have self-adjusting spring glass-holders. Both are formed of steel and finished 300° White Enamel.



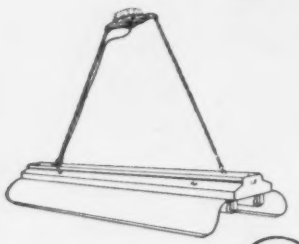
INDUSTRIAL REFLECTORS—Dome and High Bay reflectors. Four Dome sizes and 9 High Bay Types. All made of Alzak Aluminum.



PRISMATIC LENS UNITS — Recessed and Surface types with heat-resistant PYREX lenses. Surface type has opal glass sides.

HANG CHAIN SUSPENSION FIXTURES IN A FEW MINUTES

WITH HYDEE HANGER*



Just connect wires — screw to outlet box. No centering, punching, drilling. No tools except a screwdriver.

Complete with receptacle, two 5-foot chains, "S" hooks and cord clips. Self-grounding—you can use 2-wire cord and plug. Fits standard 4" or 3¼" outlet box or plaster ring. $1.65 each list

Day-Brite Lighting, Inc., 5412 Bulwer Ave., St. Louis 7, Mo. Nationally distributed through leading electrical supply houses.

In Canada: address all inquiries to Amalgamated Electric Corp., Ltd., Toronto 6, Ontario.

*Patent No. D-141024, others pending. Underwriters approved

IT'S EASY TO SEE WHEN IT'S DAY-BRITE Lighting

Robinson

● APPOINTMENT of A. R. ROBINSON as manager of John A. Roebling's Sons Seattle branch was announced recently by E. C. Low, vice-president in charge of sales. Robinson succeeds the late J. J. Wilson. He is a graduate of Oregon State College; has been in engineering and contracting work; joined Roebling's in 1936 as salesman in the Portland branch.

● GEORGE QUINAN, chief consulting engineer for Puget Sound Power & Light Co., has retired after a record with Pacific Northwest power companies dating back to his graduation from the University of California in 1903. His first job was with Washington Water Power Co. He then joined Puget Sound Power Co. on construction of its Electron power plant; was next assistant superintendent of power for the Tacoma Railway & Power Co.; later was transferred to Seattle as operating superintendent of the Seattle Electric Co. After the sale of the street railway system to the city in 1919, he was made chief electrical engineer of the Puget Sound Power & Light Co., became chief engineer in 1935 and company chief consulting engineer in 1942.

● J. E. RILEY, superintendent of public utilities in Roseville, Calif., has resigned and will return to his former post as head of the municipal water department. He had been utilities superintendent since 1939, when the position was created.

● GEORGE HIBBERT has resigned as manager of the Clark County, Wash., PUD. He had been in ill health for the two months previous to his resignation

C. D. LaMOREE
Electrical Insulation

The Spaulding Fibre Company, Inc.
Fibre — Spauldite

Irvington Varnish & Insulator Co.
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electric or air actuated, will solve your signalling problems. Easily installed, these powerful, penetrating signals have a quick cut-off, may be coded to convey a variety of messages. Built to live in industrial locations, weather and water proof; heavy construction of corrosion proof metal insures long life, dependable operation.

FEDERAL ELECTRIC CO., INC.
8723 South State Street, Chicago 19, Illinois

F. M. NICHOLAS COMPANY
1123 Harrison Street, San Francisco 3, California

● E. O. SHREVE, member of the electric industry and former Westerner, was elected president of the U. S. Chamber of Commerce to succeed Eric Johnston. Shreve was enroute to San Francisco on April 18, 1906, to be a salesman for General Electric; arrived to help build temporary quarters for the company following the earthquake and fire. By 1917 he was G-E's San Francisco manager and in 1926 he went to Schenectady. Previous to his recent retirement he was vice-president in charge of customer relations with headquarters in New York.

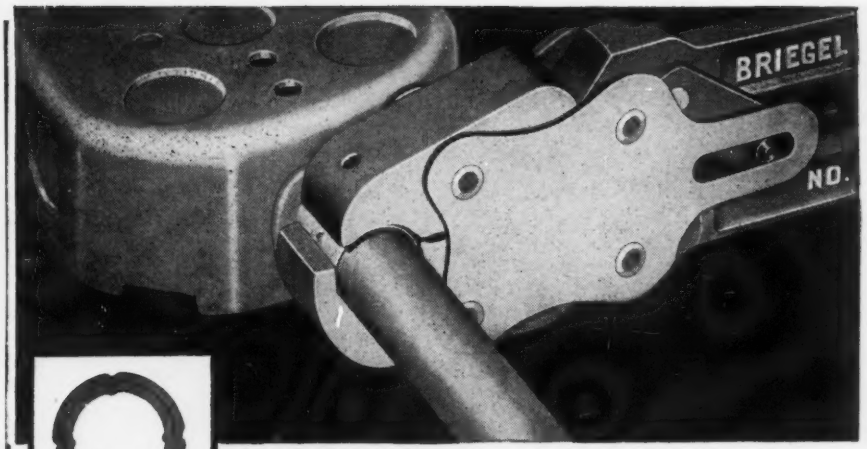
● ERNEST B. KIPP has been appointed superintendent of San Diego Gas & Electric's electric meter division. Following his graduation from the University of Utah in 1926, Kipp spent three years in the Westinghouse plants as a graduate student. Following special assignment work for the Central Arizona Light and Power Co., Westinghouse appointed him meter relay and instrument specialist for the Western territory. Kipp succeeds WILLIAM H. TALBETT, who retired.

● WILLIAM DEWAARD is now superintendent of the stores department, San Diego Gas & Electric Co. While vacationing in 1913, deWaard accepted a temporary job in the power company stores division, liked it so well that he finally wired his resignation to the Washington, Baltimore and Annapolis Railway. In 1918 he was made stockkeeper and a few years later became storekeeper.

● RIVES MATTHEWS of W. N. Matthews Corp. visited the West recently as part of an extensive business tour which has kept him on the road since January. Son of Claude L. Matthews, president of the company, he left the newspaper business last fall to join the Matthews Corp. He recently was elected a member of the board of directors and assistant to the president.

● MELVIN G. LEWIS has joined the Bechtle Corp. of Los Angeles, as senior engineer in charge of design for that company's contract involving erection of a number of substations for the Southern California Edison Co. Lewis has been with Willmot Austin Earle, consulting engineer, for the past five years, and previous to that was with the Pacific Gas and Electric.

● HOWARD E. WATERBURY has been named Department of Commerce representative on the Columbia Basin Inter-Agency Committee. Waterbury for many years has been district manager of the department's Portland office.



Cross section Showing Indentations.

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Two Squeezes and it's Set

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FOR HEATING, AIR CONDITIONING, REFRIGERATION, AND VARIOUS INDUSTRIAL APPLICATIONS

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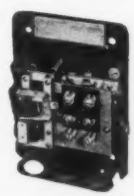

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MERCOID HAS WHAT EXPERIENCED ENGINEERS WANT IN AN AUTOMATIC CONTROL

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3. Simplified for ease of installation—*appreciated by the trade.*
4. Convenient facilities for making understandable adjustments—*no time lost in calculating or guesswork.*
5. The only 100% Mercury Switch Equipped Control Line—*which means that all "makes" "and breaks" in the electrical circuit are hermetically sealed, therefore immune to dust, dirt, corrosion, open arcing, pitting, or sticking of contacts—all common causes of contact trouble. Mercoid Switches provide an electrical contact that will give millions of perfect operations.*

The above facts merit your consideration. For detailed information see Mercoid catalog No. 600.

MERCURY SWITCHES

LIQUID LEVEL CONTROLS

THE MERCOID CORPORATION • 4201 BELMONT AVENUE • CHICAGO, ILLINOIS

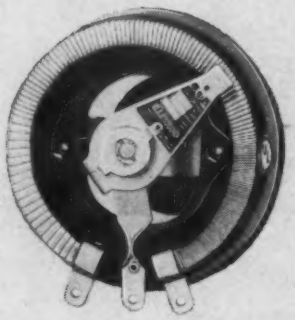
RESISTANCE CONTROL PROBLEMS

"Taper off"

When Rheostats are Sectionally Wound with DRIVER-HARRIS ALLOYS

To provide more uniform current control —and a rheostat of proportionately smaller size—the Ohmite Manufacturing Co. advocates tapered windings, involving the use of two or more sections of diminishing wire sizes. This construction is practical because only the first turn of any rheostat winding carries the maximum current. All succeeding turns carry constantly decreasing amounts.

In the 3-section, 500 watt Ohmite Model R Rheostat illustrated, three Driver-Harris nickel-chrome alloy wires — Nichrome* — Advance*—and No. 95 are employed to obtain the fine shading of resistance desired. For other resistance combinations, there are more than 80 Driver-Harris electrical resistance alloys specifically designed to fill the numerous requirements of the Electrical and Electronic Industries.



Backed by 46 years of specialized resistance-research experience, the Driver-Harris engineering staff is ready at all times to help you solve your electrical resistance problems. Why not get in touch with them for expert advice—or write for 71-page Resistance Handbook, R 46.

*Trade-Mark Reg. U. S. Pat. Office

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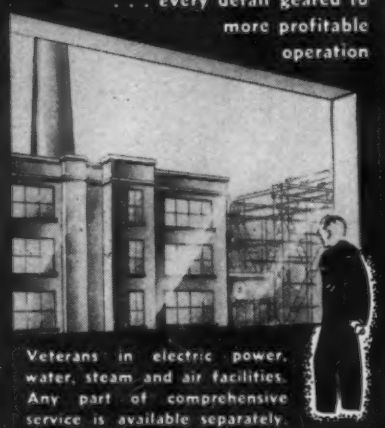


Veterans in electric power, water, steam and air facilities. Any part of comprehensive service is available separately.

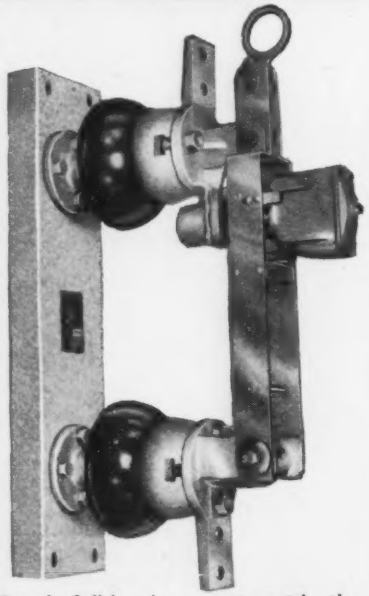
POWER DIVISION • FIDELITY BLDG. • K. C., MO.

J.F. Pritchard & Co.

ENGINEERS • CONSTRUCTORS • MANUFACTURERS
for the CHEMICAL, PETROLEUM, GAS & POWER industries

Offices in key cities. See Sweets, Refinery Catalog, Chemical Engineering Catalog, etc.

S & C LOAD INTERRUPTERS



Break full-load currents with the arc fully confined within the interrupting unit.

Single-pole or three-pole operation, indoor or outdoor service.

Write for bulletin No. 202A

GEO. E. HONN CO.

Phone SUtter 7352
420 Market St., San Francisco, Calif.

● C. W. SCHWEERS, formerly manager of the Allis-Chalmers Houston office, has been named manager of the Los Angeles district office to succeed A. D. Brown. The company announced recently that, under the new regional setup, F. V. SAMS, F. HARVEY SEARIGHT, and U. E. SANDELIN would remain as managers of the Portland, San Francisco and Seattle offices respectively. A. R. KOHLMETZ is manager of the Spokane branch of the Seattle district.

● DON UMPHREY is now with the Pacific Electric Mfg. Corp., San Francisco, as oil circuit breaker engineer. A 1932 graduation of Oregon State College, he formerly was assistant chief engineer of the Eugene Water Board and later was with Westinghouse Electric Corp. at East Pittsburgh and in the Pacific Northwest. Announcement of his association with Pacific Electric was made last month by A. A. Browne, general manager.

● F. L. SUDDITH has been appointed manager of the Butte, Mont., office of the General Electric Supply Corp., to succeed the late James L. Fahey. Suddith has been manager of the Billings warehouse and will be succeeded there by H. R. ELLERBY who formerly covered the Great Falls territory.

● A. M. CHITTY, southern division manager of Puget Sound Power & Light Co. since 1925, has resigned and will be succeeded by FRANK WALSH, former central division manager. Chitty's retirement ended 56 years in the electric utility field, 44 years with Puget Power. Walsh has been with the company since 1912.

● L. A. "BILL" WILLIAMS, vice-president of Puget Sound Power & Light Co., will take over the post of central division manager, adding this to his other duties. Headquarters of the division are at Seattle.

● HERB N. BALLARD was made superintendent of service in Puget Power's Bellingham office. Formerly in the central service department, he replaces BERT N. SORENSON, who was given a special assignment.

● R. W. BAKER, with the Chewelah, Wash., municipal light and power office for two years, has been appointed manager of the Nespelem Valley Electric Cooperative of Nespelem, Wash., succeeding BERNARD MARTIN, resigned.

● A. J. STEVENS has been made machinery resale manager for Westinghouse Electric Corp., Pacific Coast district.

NOTES ON THE TRADE

Westinghouse Tells Plans for Sunnyvale Factory

Westinghouse Electric Corp. expects to build $30,000,000 worth of electrical and steam equipment in its Sunnyvale plant during 1948, Charles A. Dostal, vice-president in charge of sales, Pacific Coast district, announced recently. This will require 3,000 workers, nearly three times the number employed now. During 1949 the company has made commitments to build $40,000,000 worth of equipment, and will require about 4,000 workers.

Production plans have been completed for the 1,000,000-sq. ft. plant acquired by Westinghouse from the Joshua Hendy Iron Works. Probably the first Westinghouse products to emerge from Sunnyvale will be distribution transformers and power transformers up to 5,000 kva., Dostal said. Production of transformers at Sunnyvale will supplement, not replace, fabrication at Emeryville.

Also to be built at Sunnyvale are a-c motors in sizes up to 1,000 hp.; vertical hollow shaft pump motors; and steam turbines up to 12,000 kw.; feed regulators, gearmotors up to 10 hp., air moving equipment, and switchgear.

• W. H. SMITH is now northern California representative for the Toastmaster Products Division of McGraw Electric Co., with headquarters in Oakland. He will work on domestic and commercial products.

Smith

RELIANCE AUTOMATIC TIME SWITCHES

Model "W"

Completely automatic . . . extremely simple, compact, economical . . . three types cover practically every requirement . . .

Astronomic Time Switch

• The Model "W" Astronomic types are particularly popular for advertising illumination. The "on" operation changes daily to correspond with local sunset time, eliminating the necessity of re-setting the dial as the days become longer or shorter.

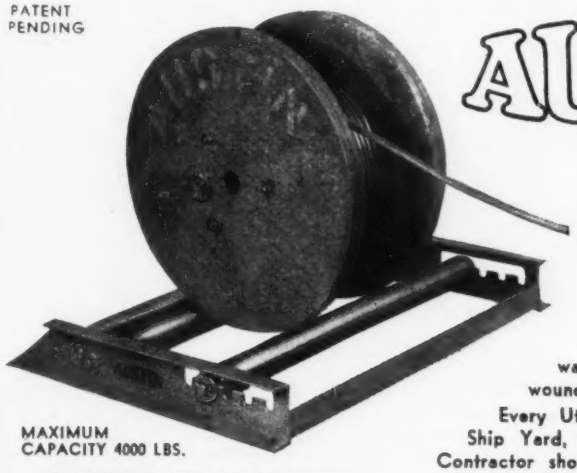
AMERICA'S RELIABLE 24 hour-a-day GUARDIANS

RELIANCE Time Switches have proved their dependability. They give complete and reliable service under many varied conditions — a factor of paramount importance when constant good service is essential. Send for catalog and price sheets for complete details.

RELIANCE AUTOMATIC LIGHTING CO.
1907 MEAD STREET RACINE, WISCONSIN

PATENT PENDING

AUSTIN



NO. 600 REEL ROLLER

A new quick, easy, safe way to dispense any material wound on a reel.

Every Utility, R. E. A. Cooperative, Ship Yard, Railroad, Wholesaler and Contractor should have several AUSTIN REEL ROLLERS. When pulling one or more cables into conduit use an AUSTIN REEL ROLLER for each cable. Can be mounted stationary or used on the job as a portable device—ideal for service and repair trucks.

MAXIMUM CAPACITY 4000 LBS.

9 OUTSTANDING ADVANTAGES

(1) Ramp—makes it quick, easy and safe to load the reel.
(2) Back roller is slightly higher, preventing the reel from being pulled off the roller when cable is removed.
(3) Reel rolls on grease packed flanged ball bearings with the greatest of ease and safety. No backlash.
(4) Thumb screw, which when tightened, prevents roller from turning for easy and safe removal of reel.
(5) Leg screw hole in each corner for stationary mounting. Hole in each side for bolting rollers together.
(6) Heavy steel frame, painted bright orange, not only adds to its appearance, but, also, makes it readily visible on the floor which helps to eliminate accidents.
(7) Five adjustable slots to take various reel diameters. No screws, washers or cotter pins to remove—simply raise up the roller and slide into the slot required.
(8) Will take any reel up to 30" in width. For larger reels, use two reel rollers and bolt together end to end.
(9) Can be used in the warehouse, on the job or truck.

PRICE $37.50 EA. NET
2% CASH 10 DAYS F.O.B. CHICAGO, ILL.
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Experienced dealers know there is only one way to make the most profit out of 28 years' preference for Lenk quality — sell all three.

The big reason for the popularity of Lenk Soldering Equipment is the uniform quality that's built into every item. The mechanic who has used any Lenk Product is a ready customer for the rest of the line. The missionary work has already been done. Get the full benefit from this rapidly accumulating tide of preference — sell all three!

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DEPT. K, NEWTON LOWER FALLS 62, MASS.
Manufacturers of soldering equipment since 1919

SERVALL CHROMIUM-NICKEL HEATING ELEMENT WIRE

Coiled and Ribbon Type
For 110-120 Volt
Used in Making
Elements for All
Heating Appliances

Send for Free Chart giving instructions for cutting to right lengths for wattage from 350 to 1100 . . . Also send for name of nearest jobber.

SERVALL CO. 3576 Gratiot, Detroit 7, Mich.

We Repeat . . . this TRICO COMBINATION

CAN'T BE BEAT!

RENEWABLE FUSES—The fuse with that "different" element. It's "powder-packed", custom-built and engineered for maximum safety, dependability and to give THREE TIMES THE SERVICE. Built for service—not down to price.

KLIPLOK CLAMPS—Lock fuses and clips together with vice-like pressure that counts. Eliminate unnecessary heating, fuse blowings, shutdowns and wasted current. A real dividend-paying investment!

WRITE FOR CATALOG!

TRICO FUSE MFG. CO. Milwaukee, Wis.

William Nodder, sales engineer, George E. Honn Co., San Francisco representative for Burndy Engineering Co., was in New York last month. He poses here at U. N. headquarters site

● SUES, YOUNG & BROWN of Los Angeles has announced changes and appointments in executive personnel. Marshall C. Wells will be assistant general sales manager in addition to his duties as manager of the range, refrigerator and washing machine division. Jack McLennan will be general field sales manager for all products. Donald Piper has been made manager of the Zenith radio division. Pete Frank becomes manager of the general appliance division. C. D. Walker becomes resident sales representative for San Diego and Imperial counties.

● WALTER TOLY, manager of Columbia Electric's manufacturing division, reports that the firm has been named a supplier for the General Electric Corp. It will supply fluorescent and incandescent lighting fixtures. Toly also announced that Richard C. English will be general sales manager. He goes to Spokane from Portland where he was connected with the Miller Co. of Meriden, Conn.

● ETS-HOKIN & GALVAN, marine electricians, will be sole agents in California for General Electric radar equipment, according to Charles T. Haist, Pacific district marine representative of the company's electronics department. Main office of Ets-Hokin & Galvan is at 551 Mission St., San Francisco.

Performance Plus

Type A Heavy Duty Industrial Safety Switch — one of a complete line of Square D safety switches available in a wide range of sizes and enclosures

with SQUARE D Safety Switches

Positive pressure fuse clips effect 60% reduction in heating of fuse clip contacts. Multi-spring jaws assure uniformly distributed contact pressure. Square D quick-make and quick-break mechanism eliminates dead center. Arc suppressors (supplied on switches rated above 250 volts) increase rupturing capacity by 500% or more. And—completeness of line means the right switch for any given application.

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PROFILES

Left: C. H. Volz, recently made southern California and Arizona manager for Lynn & Chemnitz, Pacific Coast manufacturers' representative. He has been with Brown-Johnston, Spokane, and Cannon Electric of Los Angeles.

Below: speakers at the agricultural clinic sponsored by the Northwest Electric Light & Power Assn. (story page 116); Dr. W. R. Van Dersal, Soil Conservation Service; Roy Godley, EEI; A. G. Mayer, WWP; Dr. J. C. Knott, Washington State College; Frank Mackaness, PGE; Dr. Mark Buchanan, Washington State College; George T. Hudson of the United States Department of Agriculture.

Below: officers and some charter members of the Utah Chapter, Illuminating Engineering Society, at its organization. Front row—J. H. Shaw, Utah Power & Light Co., manager; Dr. Leland H. Brown, Stanford University, regional vice president; A. E. Fleming, General Electric Supply Corp., chairman Utah Chapter; J. C. Littlefield, UP&L, secretary-treasurer; Back row—Bill Smith, Line Material Co.; Carl Frisbee, G-E Lamp Dept.; Dean Jenks, same; Arthur J. Reynolds, manager, Intermountain Electrical Assn. Two of the board, D. H. Hutchinson, Graybar, and Maurice Dusenberry, Line Material Co., were absent.

Footnotes* ...to the California Scene

SCENE 4:

INVESTMENT

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**To encourage new local investment, P. G. and E., through nationwide advertising, has acclaimed Northern California's industrial advantages to millions of readers. We maintain a staff of engineers to answer industrial inquiries with facts and statistics. Dependable gas and electric service, at rates far below average, invites new users to this area.*

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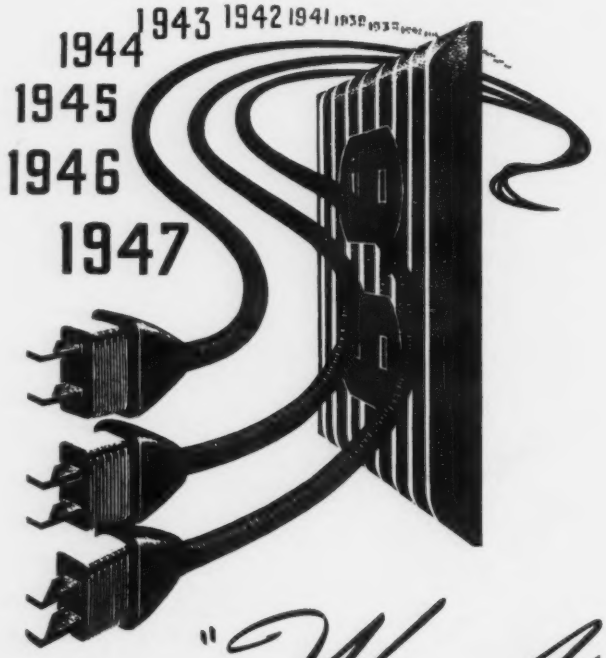

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